

EVALUATION OF A CHEF BASED INTERVENTION
ON STAKEHOLDERS' SATISFACTION WITH
SCHOOL LUNCH

By

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EVALUATION OF A CHEF BASED INTERVENTION
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SCHOOL LUNCH

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Abstract:

Chef-based training programs addressing culinary skills of school nutrition professionals are a growing trend. Studies of these interventions reflect better compliance with the 2012 USDA school meal regulations; less is known if they influence satisfaction of school meals among students, parents and faculty. The purpose of this project was to investigate if a chef-based intervention, *Cooking for Kids*, influenced stakeholder groups' satisfaction with the lunch program. The pre/post study was conducted in seventeen school districts that participated in the 9-month program. The survey was based on the satisfaction scale developed by the Child Nutrition Institute, and included a question assessing frequency of participation and open-ended comments. Scale items and overall satisfaction were compared using a 2x3 analysis of variance for time and frequency of participation. Comments were coded by theme; frequency analysis was used to identify common themes. Chi-square was used to determine if the proportion of negative versus positive survey comments changed over time. The number of stakeholders that completed the surveys was 3,820 students, 660 parents, and 364 faculty. After the intervention, there was no change in satisfaction among students but there was a measured increase in satisfaction among parents and administrators/faculty. Across all groups, stakeholders who always participated in the NSLP reported higher overall satisfaction compared to those who sometimes or never participated ($p < 0.001$). Faculty had a significant shift in the proportion of negative to positive comments ($p = 0.004$). The prevalent themes were related to taste and appeal of the food. Stakeholders who participated in the school lunch program were likely to be satisfied with the meals, compared to those who never participate. Appeal and taste tended to drive satisfaction. Soliciting input for school menus and introducing new foods with taste testings, among both participants and non-participants, may help increase stakeholders' satisfaction.

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CHAPTER I

INTRODUCTION

The National School Lunch Program (NSLP) serves over 31 million school lunches daily to school-age children, providing an average 35% of their daily intake of calories (U.S. Department of Agriculture, 2013). Schools play a significant role in providing a supportive environment to apply practices and policies that promote healthy eating behaviors among a large population (Briefel, Crepinsek, Cabili, Wilson, & Gleason, 2009). Schools participating in the NSLP follow federal regulations and nutrition standards in planning and offering meals to students. In 2010, the Healthy Hungry Free Kids Act (HHFKA) authorized the United States Department of Agriculture to update the school nutrition program regulations to be consistent with Dietary Guidelines for Americans, 2010 (USDA, 2013a).

These updates presented school nutrition professionals (SNP) with new challenges and many requested training and guidance to successfully provide meals consistent with the new standards (Weir & Sharma, 2016). A common concern among the school nutrition professionals was that meals meeting the new requirements would not be appealing to students and thus lower their satisfaction with the program (Weir & Sharma, 2016, TSET, 2015).

In response to the requests for training assistance and concerns, an emerging and growing approach is a chef-based intervention model targeting school nutrition professionals and conducted in school settings. Industry trained chefs can provide assistance in culinary training, menu planning, budget management, and innovative approaches to help guide them through the new regulations while keeping meals both healthy and appealing (Condrasky & Griffin, 2010). Previous chef intervention studies have investigated the impact of chef based training programs to help school nutrition professions prepare healthy, appealing meals which resulted in an increase of vegetable and whole grain consumption, school lunch sales, and school nutrition professionals' confidence in culinary skills (Cohen et al., 2012; Condrasky, Sharp, & Carter, 2014; Just, Wansink, & Hanks, 2014). Prior *Cooking for Kids* evaluation studies discovered that after the chef intervention resulted in an increase use of mise en place, *Smarter Lunchroom* strategies, salad bars, and students' consumption of fruits and whole grains (Powell, 2017; Till, 2017). Within the literature, chef interventions have shown a potential in increasing school nutrition professionals' culinary skills, students' healthy food consumption, and providing healthy school meals.

Culinary training of the school nutrition professionals can also improve stakeholders' food preferences and perceptions of school meals, and thus satisfaction (Cohen et al., 2012). Food quality, variety of food offered, and flavor of the school meals are the most influential factors of satisfaction (Meyer & Conklin, 1998). If the stakeholders' satisfaction increases this may lead to an increase of school lunch participation (Rushing, 2013). Furthermore, if the school lunch meals provided are healthy and satisfying, the stakeholders would be more prone to choosing healthier options (Rushing, 2013).

Consistent with the emerging trends and body of evidence, *Cooking for Kids* utilizes industry trained chef educators to train Oklahoman school nutrition professionals in basic

culinary skills. The goal is to build school lunch professionals' capacity to provide Oklahoman school children with meals that are nourishing and appealing to maintain or improve satisfaction with the program, and ultimately improve participation.

Problem Statement:

Some studies have measured the impact of chef-led school nutrition interventions on students' consumption of the meals (Cohen et al., 2012; Just et al., 2014). However, there is a lack of research on how these programs influence faculty's, parents', and students' perception and satisfaction of school meals.

Purpose and Objectives:

The purpose of this multi-method study was to identify if a chef-consult intervention impacted parents', administrator/faculties', and students' satisfaction with the school meal program. Specific objectives included:

- 1) Measure and compare each stakeholder group's satisfaction by participation group before and after chef consult.
- 2) Measure and compare each stakeholder group's satisfaction before and after the chef-consultation intervention at the school site level.
- 3) Compare satisfaction levels of stakeholders who do and do not participate in the school nutrition program.
- 4) Identify and compare pre- and post- emergent themes from the survey comment section for each group of stakeholders.

Hypothesis 1:

Null 1.1: There will be no change in middle/high students' satisfaction by participation group after chef consult.

Alternative 1.2: There will be an increase in middle/high students' satisfaction by participation group after chef consult.

Null 1.3: There will be no change in parents'/guardians' satisfaction by participation group after chef consult.

Alternative 1.3: There will be an increase in parents'/guardians' satisfaction by participation group after chef consult.

Null 1.4: There will be no change in administrators'/faculty's satisfaction by participation group after chef consult.

Alternative 1.4: There will be an increase in administrators'/faculty's satisfaction by participation group after chef consult.

Hypothesis 2

Null 2.1: There will be no change in middle/high students' satisfaction after a chef-consult intervention at the school site level.

Alternative 2.1: There will be an increase in middle/high students' satisfaction after a chef-consult intervention at the school site level.

Null 2.2: There will be no change in parents' satisfaction after a chef-consult intervention at the school site level.

Alternative 2.2: There will be an increase in parents' satisfaction after a chef-consult intervention at the school site level.

Null 2.3: There will be no change in administrators' and faculty's satisfaction after a chef-consult intervention at the school site level.

Alternative 2.3: There will be an increase in administrators' and faculty's satisfaction after a chef-consult intervention at the school site level.

Hypothesis 3:

Null 3.1: There will be no difference in satisfaction between students who do and do not participate in the school nutrition program.

Alternative 3.1: There will be a greater increase in students' satisfaction in those that participate compared to non-participants in the school nutrition program.

Null 3.2: There will be no difference in satisfaction between children of parents who do and do not participate in the school nutrition program.

Alternative 3.2: There will be a greater increase in children of parents' satisfaction in those that participate compared to non-participants the school nutrition program.

Null 3.3: There will be no difference in satisfaction between administrators and faculty who do and do not participate in the school nutrition program.

Alternative 3.3: There will be a greater increase in administrators' and faculty's satisfaction in those that participate compared to non-participants in the school nutrition program.

Hypothesis 4:

Null 4.1: There will be no change in middle and high school students' comments satisfaction after a chef-consult intervention at the school site level.

Alternative 4.1: There will be a shift from negative to positive comments in middle and high school students' after a chef-consult intervention at the school site level.

Null 4.2: There will be no change in parents' and guardians' shift from comments about satisfaction after a chef-consult intervention at the school site level.

Alternative 4.2: There will be a shift from negative to positive comments in parents' and guardians' comments about satisfaction after a chef-consult intervention at the school site level.

Null 4.3: There will be no change in administrators' and faculty's comments about satisfaction after a chef-consult intervention at the school site level.

Alternative 4.3: There will be a shift from negative to positive comments in administrators' and faculty's after a chef-consult intervention at the school site level.

Limitations:

The school districts distributed the surveys to three general groups of stakeholders: administrators/faculty, parents and students. This method created several limitations for the study. First, researchers were not able to match an individual's pre- and post- responses, limiting the strength of the evaluation to detect change at the individual level. Second, there was a lower post intervention response rate compared to the pre-intervention response rate. This may be explained in part by conflicting priorities at the time the post intervention surveys were distributed (e.g. standardized testing). Additionally, the study did not account for the school clusters receiving different interventions based on their needs assessment. Even though the study had some limitations, there were several strengths. There was an overall large sample size from seventeen different school-site locations. A second strength is that satisfaction was measured using tested tool of known factors associated with meal satisfaction. Finally, the study took into account all

three of the stakeholders that have a role in the school lunch program to measure satisfaction with a diverse population.

Terms and Definitions:

- **National School Lunch Program (NSLP):** The program was established by President Harry Truman in 1946 under the National School Lunch Act to address the health and well-being of America's youth (USDA, 2013). The National School Lunch Program operates in public and non-profit private schools and child care institutions. The program provides nutritionally adequate meals during each school day to all students enrolled in the school and are offered at low cost or free to children residing in eligible households (USDA, 2016b). The USDA Food and Nutrition Service serves as the regulatory agency for state agencies' administering the program.
- **United States Department of Agriculture (USDA):** The program is a U.S. federal executive department responsible for developing and executing federal laws concerning farming, agriculture, forestry, nutrition, and food. The program aims to promote agriculture production to nourish Americans, ensure food safety, protect natural resources, foster rural communities, and end hunger in the U.S. and globally (USDA, 2017).
- **Healthy Hungry Free Kids Act 2010 (HHFKA):** The act authorized funding for child nutrition programs to increase accessibility to healthy food for school children. The act aimed to improve the nutrition quality of commodity foods, gave authority to USDA to update nutrition standards, promoted nutrition and wellness, and set standards for school wellness policies (The White House, 2010).
- **Institute of Child Nutrition (ICN):** A federally funded national center, previously known as the National Food Service Management Institute, is located at the University of

Mississippi and focuses on applied research, education and training, and technical assistance for Child Nutrition Programs. The Institute offers face-to-face training, on-site training seminars, and online courses to support the professional development of child nutrition programs. Also, the Institute conducts needs-based studies and research that focuses on aspects that impact the success of child nutrition programs (Institute of Child Nutrition, 2017).

- **School Nutrition Professionals:** School foodservice employees that are responsible for the planning, preparation and serving of all school meals.
- **Offer versus Serve:** High school students are required to take three out of the four (or five) food items at breakfast and three out of the five items at lunch. *Offer versus Serve* is optional for elementary and middle school students. Students are also required to take a vegetable or fruit for a reimbursable meal.
- **Mise en Place:** A French culinary phrase meaning “everything in its place”. It is a technique chefs use to prepare and organize ingredients, and set out proper equipment to assemble meals efficiently.

CHAPTER II

REVIEW OF LITERATURE

National School Lunch Program

In 1946, President Harry Truman signed the National School Lunch Act to federally assist schools with providing nutritionally balanced meals to public schools, and non-profit private schools. The law authorized the United States Department of Agriculture (USDA) to establish regulations to govern the program, known as the National School Lunch Program (NSLP). It operates in over 100,000 public and non-profit private schools and reaches over 31 million children each school day for school lunch. While all children are eligible to participate, children of low-income families qualify for free or reduced price lunches. Over the years, the NSLP has grown into one of the largest food assistance programs in the United States (USDA, 2013).

School lunches must meet regulated meal pattern and nutrition standards based on the Dietary Guidelines for Americans to provide nutritious meals (School Nutrition Association, 2018). Each meal must offer age-appropriate quantities of vegetables, fruit, protein, grains, and dairy food items. While the meal patterns are federally regulated, the local school districts have flexibility in planning the menus (USDA, 2013).

National School Lunch Program Prior Healthy Hunger Free Kids Act

Since 1946, school meal regulations and patterns have been periodically revised to align with the most current nutrition science and evidence. For example, in 1995 the USDA was required to align meal pattern requirements with the Dietary Guidelines for Americans. Even with periodic updates, an analysis based on data from the School Nutrition Dietary Assessment Study (SND-III) from 2004-2005 and 24-hour recalls suggested improvement was needed in the meals provided in the NSLP (Clark & Fox, 2009). The majority of school children met adequate nutrition standards except for unsatisfactory intakes of saturated fat, sodium, and fiber. Fiber intake of the school meals was shown to be low in all children. Roughly 80% of school children had intake of saturated fat that exceeded the 2005 Dietary Guidelines and 92% had excessive intakes of sodium (Clark & Fox, 2009).

To better align school meals with dietary guidelines, congress requested the Institute of Medicine (IOM) to make new recommendations. After studying the school meal requirements, IOM recommended nutrients standards be based on age-grade groups with specified recommended amounts of calories, nutrients, saturated fats, cholesterol, sodium, and dietary fiber (Institute of Medicine, 2010). To achieve this, IOM stated standards for menu planning should improve the healthiness of school meals by increasing fruits, vegetables, and whole grains, and reducing saturated fat and sodium and align with Dietary Guidelines for Americans and Dietary Intake Recommendations. Additionally, IOM also recommended standards for meals selected by students through *Offer versus Serve* should require students to pick a fruit or vegetable to reduce plate waste while maintaining the nutrition integrity of school meals (Institute of Medicine, 2010). However, change of policy and new recommendations for meals would likely require assistance and training of school food service professionals, nutrition education, and changes to the school environment (Crepinsek, Gordon, McKinney, Condon, & Wilson, 2009).

Healthy Hunger Free Kids Act 2010

In 2010, Congress passed the Healthy Hunger-Free Kids Act 2010 (HHFKA) authorizing the US Department of Agriculture's Food and Nutrition Services (USDA/FNS) to revise the school meal patterns and nutrition standards to align with the most current Dietary Guidelines. The regulations were released January 26, 2012, and were the first federal change in 15 years. The changes, reflecting IOM recommendations and the 2010 Dietary Guidelines, were designed to address childhood obesity and reduce the prevalence of childhood hunger (Marcason, 2012).

These standards focused on increasing whole grains, fruits, and vegetables and decreasing trans-fat, sodium, and calories. Timelines for meeting the new meal requirements were phased in over a two-year period. Initially, the regulations required a daily serving of $\frac{1}{2}$ to 1 cup of fruit, $\frac{3}{4}$ to 1 cup of vegetables, meat or meat alternatives, and at least half the grains must be whole grain-rich sources. By 2014, all grains were required to be whole grain-rich. The standards for fat content of milk remained as fat-free flavored or unflavored low fat unflavored. While "Offer versus Serve" remained a requirement for high school age students and optional for lower grades, new requirements required students to select at least $\frac{1}{2}$ cup of fruits or vegetables with their meal. Dietary specifications were set for calorie limits and sodium content for age-appropriate meals for specific grades K-5, 6-8, and 9-12. The school meals also eliminated trans-fat, and limited saturated fat to less than 10% of calories (Marcason, 2012). The USDA's current guidelines for NSLP and SBP are summarized in Table 2.1.

Table 2.1 - Final Rule Nutrition Standards for NSLP and SBP – January 2012

	Breakfast Meal Pattern			Lunch Meal Pattern		
	Grades K-5 ^a	Grades 6-8 ^a	Grades 9-12 ^a	Grades K-5	Grades 6-8	Grades 9-12
Meal Pattern	Amount of Food ^b Per Week (Minimum Per Day)					
Fruits (cups) ^{c,d}	5 (1) ^e	5 (1) ^e	5 (1) ^e	2½ (½)	2½ (½)	5 (1)
Vegetables (cups) ^{c,d}	0	0	0	3¾ (¾)	3¾ (¾)	5 (1)
Dark green ^f	0	0	0	½	½	½
Red/Orange ^f	0	0	0	¾	¾	1¼
Beans/Peas (Legumes) ^f	0	0	0	½	½	½
Starchy ^f	0	0	0	½	½	½
Other ^{f,g}	0	0	0	½	½	¾
Additional Veg to Reach Total ^h	0	0	0	1	1	1½
Grains (oz eq) ⁱ	≥7 (1) ^j	≥8 (1) ^j	≥9 (1) ^j	≥8 (1)	≥8 (1)	≥10 (2)
Meats/Meat Alternates (oz eq)	0 ^k	0 ^k	0 ^k	≥8 (1)	≥9 (1)	≥10 (2)
Fluid milk (cups) ^l	5 (1)	5 (1)	5 (1)	5 (1)	5 (1)	5 (1)
Other Specifications: Daily Amount Based on the Average for a 5-Day Week						
Min-max calories (kcal) ^{m,n,o}	350-500	400-550	450-600	550-650	600-700	750-850
Saturated fat (% of total calories) ^{n,o}	< 10	< 10	< 10	< 10	< 10	< 10
Sodium (mg) ^{n, p}	≤ 430	≤ 470	≤ 500	≤ 640	≤ 710	≤ 740
Trans fat ^{n,o}	Nutrition label or manufacturer specifications must indicate zero grams of trans fat per serving.					

^aIn the SBP, the above age-grade groups are required beginning July 1, 2013 (SY 2013-14). In SY 2012-2013 only, schools may continue to use the meal pattern for grades K-12 (see § 220.23).

^bFood items included in each food group and subgroup and amount equivalents. Minimum creditable serving is ½ cup.

^cOne quarter-cup of dried fruit counts as ½ cup of fruit; 1 cup of leafy greens counts as ½ cup of vegetables. No more than half of the fruit or vegetable offerings may be in the form of juice. All juice must be 100% full-strength.

^dFor breakfast, vegetables may be substituted for fruits, but the first two cups per week of any such substitution must be from the dark green, red/orange, beans and peas (legumes) or “Other vegetables” subgroups as defined in §210.10(c)(2)(iii).

^eThe fruit quantity requirement for the SBP (5 cups/week and a minimum of 1 cup/day) is effective July 1, 2014 (SY 2014-2015).

^fLarger amounts of these vegetables may be served.

^gThis category consists of “Other vegetables” as defined in §210.10(c)(2)(iii)(E). For the purposes of the NSLP, “Other vegetables” requirement may be met with any additional amounts from the dark green, red/orange, and beans/peas (legumes) vegetable subgroups as defined in §210.10(c)(2)(iii).

^hAny vegetable subgroup may be offered to meet the total weekly vegetable requirement.

ⁱAt least half of the grains offered must be whole grain-rich in the NSLP beginning July 1, 2012 (SY 2012-2013), and in the SBP beginning July 1, 2013 (SY 2013-2014). All grains must be whole grain-rich in both the NSLP and the SBP beginning July 1, 2014 (SY 2014-15).

^jIn the SBP, the grain ranges must be offered beginning July 1, 2013 (SY 2013-2014).

^kThere is no separate meat/meat alternate component in the SBP. Beginning July 1, 2013 (SY 2013-2014), schools may substitute 1 oz. eq. of meat/meat alternate for 1 oz. eq. of grains after the minimum daily grains requirement is met.

^lFluid milk must be low-fat (1 percent milk fat or less, unflavored) or fat-free (unflavored or flavored).

^mThe average daily amount of calories for a 5-day school week must be within the range (at least the minimum and no more than the maximum values).

ⁿDiscretionary sources of calories (solid fats and added sugars) may be added to the meal pattern if within the specifications for calories, saturated fat, trans fat, and sodium. Foods of minimal nutritional value and fluid milk with fat content greater than 1 percent milk fat are not allowed.

^oIn the SBP, calories and trans fat specifications take effect beginning July 1, 2013 (SY 2013-2014).

^pFinal sodium specifications are to be reached by SY 2022-2023 or July 1, 2022. Intermediate sodium specifications are established

In addition to school meals, the HHKFA had the objective to promote healthier school environments for school children. It focused on providing education and wellness initiatives that promoted stronger school nutrition and physical activity wellness policies. Stronger regulations increased school compliance to meet nutrition standards and improved meal financing to provide healthier meals (Wootan, 2012). Compared to previous standards, it doubled the number of fruits and vegetables, increased whole grains, reduced sodium, limited trans and saturated fat, provided milk that was low-fat or non-fat, and ensured schools provided enough calories to address hunger but not contribute to obesity (Wootan, 2012). Overall, the new regulations strive to increase the health and well-being of school children.

After the implementation of the updated meal pattern and nutrition standard regulations, Johnson and colleagues (2016) found there was a significant improvement in the nutritional quality of foods chosen by students and the new standards led to more nutritious meals (Johnson, Podrabsky, Rocha, & Otten, 2016). The study, conducted in three middle and three high schools in the state of Washington, assessed nutrition quality by calculating the monthly mean adequacy ratio and energy density from foods selected by students and the participation rates. Calcium, vitamin C, vitamin A, iron, fiber, and protein were the six nutrients that were analyzed to form the mean adequacy ratio to measure nutrition density. Overall, after a year of implementing the updated meal pattern requirements, the findings showed improvement in nutrient content and decreased energy density without much effect on participation rates (Johnson et al., 2016). Another study evaluated four schools that achieved the HealthierUs Schools Challenge award before and after the implementation of the updated regulation (Bergman, Englund, & Taylor, 2014). This award is given to schools that promote a healthier environment through nutrition and

physical activity. Conducted in 2013, the researchers took digital photos of lunches before and after consumption. The photos were evaluated to make estimations of nutritional content of meals selected and consumed. Compared to before the updated regulations, students' average consumption of sodium was reduced from 844 mg to 647 mg, saturated fat levels were reduced from 9.04% to 5.46%, and fiber increased from 4 grams to 9 grams in the school lunches (Bergman et al., 2014). These positive changes are a reflection that the school child nutrition directors can successfully make menu changes and uphold the nutrition standards. With both these two studies, the updated regulations showed positive effects in increasing the nutrition in school meals.

Barriers of School Nutrition Professionals to Meet New Guidelines

As with most changes, implementation of the 2012 meal guidelines will take time and effort from the school nutrition professionals (SNP) to ensure success. Weir and Sharma (2016) analyzed Mealtalk email discussions for SNPs to understand their point of view on their efforts to overcome challenges with the implementing the new guidelines. SNP were uncertain how to purchase new products and if their current food suppliers sold products that would meet the requirements (Weir & Sharma, 2016). The supervisors asked if assistance was available and concerned about the cost of staff training to comply with the guidelines. Other barriers that troubled SNP were menu planning, finding recipes, ensuring the supply of fruits and vegetables, incorporating whole grains, offering healthy foods and meeting nutrient guidelines. The SNP found it difficult to identify foods that students liked and how to make the food more appealing. Food directors were concerned that offering healthier options would decrease palatability and participation (Cohen et al., 2012). They wondered what was the point of serving food to students that they would not eat or if they would be accepting of the new menus (Weir & Sharma, 2016).

This could result in hungry students and food waste, and the SNP needed to identify solutions in creating foods that would appeal and satisfy the students.

School Food Environment

The school environment holds great potential for encouraging healthy behaviors, and for those behaviors to become permanent (Johnson et al., 2016). As such, the National School Lunch Program has tremendous influence on children's eating behaviors and serve meals to roughly 30 million students daily in the United States (USDA, 2013). However, Cho and Nadow (2004) posit that enforcing changes to promote a healthier school food environment requires cooperative efforts from the school community. They defined a quality school lunch program as "schools [that] provide lunches that offer a variety of healthy, tasty, and diverse choices and students are encouraged to participate" (Cho & Nadow, 2004). To study the usefulness of the collaborative approach, they mailed surveys to superintendents, food service directors, nurses, and health educators (Cho & Nadow, 2004).

Superintendents who responded shared the necessity of selling unhealthy foods rather than healthy options because the students would be more likely to purchase unhealthy foods. Students tend to prefer unhealthy meals by purchasing more popular foods such as pizza, French fries, and chicken nuggets. They worried that even if they offered healthier meals, students would choose the less nutritious ones (Cho & Nadow, 2004). In contrast, the health educators believed that parents who provided a nutritious home environment were influencing and contributing to students' healthier preferences at school. They also believed some parents were unaware of their children eating unhealthy foods at school. From the health educators' feedback, the comments suggested that parental involvement would be beneficial by educating the parents with skills to help the children develop healthy eating habits (Cho & Nadow, 2004). Food service directors indicated that education and training for the staff were necessary in obtaining more recipes, and

knowledge about healthy foods (Cho & Nadow, 2004). The researchers concluded successful implementation of a quality lunch required commitment and collaboration of food service directors and staff with facilitation from superintendents and principals. In addition, parents' support and students' preferences were key components on the effectiveness of school lunch. However, a limitation of the study was that it did not include students or parents to give a more comprehensive understanding (Cho & Nadow, 2004).

A study by French and Story (2013) also concluded SNP have the power to influence students' food choices and their willingness to receive training about healthful eating to guide students. In addition, the USDA and supportive organizations can work to support schools to provide assistance and training for successful implementation in providing healthy meals (French & Story, 2013). Overall, these methods could increase the health of students by encouraging healthy eating behaviors through providing appealing, healthy meals, and a promoting a positive school food environment. However, because students and parents are key stakeholders in the school environment, it is important for schools to understand barriers to implementing changes to school nutrition and collaborate with these two groups.

Perception of School Meals

In a national study conducted by the Pew Charitable Trust (2014), the majority of parents supported healthy nutritional standards for foods and beverages sold to their children at school. The telephone survey assessed parents' opinions of nutrition standards, and found 72% of parents favored national standards for school meals (Pew Charitable Trust, 2014). Parents shared their support to include fruits and vegetables in every school meal (91%) and limit salt intake (75%) (Pew Charitable Trust, 2014). Parents were supportive of providing nutritious food in school and shared concern for the status of children's health and childhood obesity.

Similar to supporting healthy school meals, parents' perceptions that school meals are healthy are a significant predictor of the likelihood of a student eating school lunch (Ohri-Vachaspati, 2014). The researchers categorized parents into those that perceived school lunch to be somewhat unhealthy, very unhealthy, somewhat healthy, and very healthy and compared parent's perceptions to the percentage of students consuming school lunch. The proportion of participating students consuming school meals whose parents perceived lunch to be somewhat unhealthy (71.6%) was significantly lower than those with parents who perceived the meals were somewhat healthy (89%) and very healthy (92%). As such, parental perception of the nutritional quality of meals influenced students' participation.

Lambert and colleagues (2002) conducted a 60 item Parent School Lunch Survey (PSLS) to measure the strength of parents' beliefs influencing elementary students' participation and had similar results. The study concluded parents who intended to encourage their children to participate in the school lunch program was strongly correlated with their child's participation. An individual's beliefs can influence their intentions, and a majority of parents were found to have positive attitudes towards school lunch (79%), and only 5% believed school lunch was harmful. Additionally, parents believed school lunch provided their child with a nutritious meal (90%) and healthy foods (89%) which were both important to the parents. Interestingly, only 39% knew the amount their child actually ate and 56% believed school lunch tasted better than a packed sack lunch from home. A parents' intention to encourage or discourage their child's participation was influenced by their feelings towards the school lunch program, and the authors concluded it may be beneficial for food service directors to target improving parents' beliefs to increase student participation.

Implementing new school nutrition policies can bring forth a healthier school environment, and collecting feedback of stakeholders to make adequate changes can be

beneficial. MacLellan and colleagues (2010) analyzed students' and parents' perception of changes in school nutrition policy to view the stakeholders' views after the school enforced a new nutrition policy. Generally, parents supported the idea of a healthier school food environment, however, some parents believed children's dietary habits were not the school's responsibility (MacLellan, Holland, Taylor, McKenna, & Hernandez, 2010). Parents understood that this policy had difficulties in its implementation such as satisfying the entire student body's taste preferences. The students shared they preferred lunches with more variety and would like the ability to have input in menu changes. They realized some lunches were healthier, however, healthiness did not influence their consumption. The students recognized and accepted the policy changes were implemented to improve their diet and believed policies needed strong student support to potentially increase acceptance of new foods (MacLellan et al., 2010).

Askelson and colleagues (2017) examined parents' perceptions and attitudes of school breakfast. Some parents of children that participated believed school breakfast was convenient (45.5%), nutritious (17.5%), healthy (39.5%), provided food their child liked (17.5%), and kept their child from being hungry (19.5%). Factors influencing non-participation were the child preferred to eat at home (32.3%), belief that meals were parental responsibility (19.9%), perceived high cost (13.1%) and lack of control of what their child ate (19.9%). Some parents did not know if the meals were healthy (32.3%), and were unaware of the nutritional content of the meals and tended to make assumptions about the types of food offered (Askelson et al., 2017). Interestingly, of the parents of non-participating students, 71.2% would support their child if they wanted to eat school breakfast. Strategies to communicate with parents to improve the perception of parents could focus on the benefits of school meals by highlighting the nutritional quality, cost advantages, and convenience of school meals may increase participation (Askelson et al., 2017). Combined, these studies suggest that efforts to inform parents about implementation of schools'

efforts to provide healthier meals may decrease student's resistance to healthy school offerings (Ohri-Vachaspati, 2014).

A qualitative study, conducted by Bailey-Davis and colleagues (2013) in an urban setting included middle school students as well as their and parents to study the perceptions and consumption of free school breakfast. In focus groups, both parents and adolescents agreed that eating breakfast was important to learning, and helped avoid being hungry or fatigued (Bailey-Davis et al., 2013). Since the food preparation was not visible, some students stated that the food was untrustworthy, processed, and prepackaged. They believed if the food was made on-site then it would have more flavor than heat and serve foods. There was also a negative social stigma with students who ate free or reduced school meals. Students confirmed they would be bullied when they participated in SBP and choose to eat before school or go hungry (Bailey-Davis et al., 2013). The researchers suggested strategies such as menu sharing, student tasting, and empowerment to overcome social stigma to increase school meal participation.

Knowing students' perception of school meals is essential because it affects students' participation and can address concerns to improve the quality of the school lunch program. The objective of a study conducted by Meyer and Conklin (1998) was to analyze if high school students' satisfaction was directly related to the participation in school lunch. A valid and reliable survey was distributed in nine schools to students in grades 9-12. The researchers found satisfaction was directly correlated with the variety of food offered, flavor, the attractiveness of the serving line, staff smiling and greeting students, courtesy of staff, and quality of ingredients (Meyer & Conklin, 1998). The top predictors of satisfaction were the variety, flavor, and quality of food. In addition, those who ate school lunch more frequently had higher satisfaction compared to those who ate less frequently (Meyer & Conklin, 1998). Meyer and Conklin (1998) found a significant difference in satisfaction between groups that never ate school lunch and those that ate

school lunch 3-5 times a week on dining ambiance, food quality, and food staff. The researchers concluded that school nutrition professionals might consider the number of choices, the attractiveness of the food, flavor, and creativity of menu planning to satisfy students (Meyer, 2000a).

Meyer and Conklin's (1998) findings were similar to those in an older study of students' satisfaction on school meals. Marples and Spillman (1995) distributed questionnaires to high school students concerning factors that contributed to participation the school lunch program. High school students whose parents had a positive attitude towards the school lunch program, were more likely to participate. Students claimed the school food was not nutritious and the portion sizes were too small. Significant factors influencing participation were perceived quality, variety, length of lunch, and the atmosphere of the lunch rooms. Factors that did not influence participation were lunch habits, food preferences, influence of peers, portion size, price, and friendliness (Marples & Spillman, 1995). The researchers suggested improving participation by improving the quality of the food, offering more choices, lengthening the time of lunch, speeding the service, providing a nutritional workshop on the benefit of lunches, and limiting the availability of other food options (Marples & Spillman, 1995).

After the implementation of the updated regulations and meals standards, many school nutrition professionals and administrators felt the students were resistant to the new healthy food items and faced barriers on providing foods that were appealing (TSET, 2015; Weir & Sharma, 2016). Contrary to this belief, a study conducted in 2017 found that high school students supported healthier meal standards and expressed an appreciation for the new federal initiatives to improve the healthiness of school meals (Asada, Hughes, Read, Schwartz, & Chriqui, 2017). The majority of students shared the sudden meal changes were initially poorly received due to the lack of communication about the significance of updated regulations and nutrition education on the importance of healthy eating. Students also wanted to be acknowledged as an important

stakeholder of the school lunch program, and expressed the desire of having a voice in the changes in the school food environment. Also, the students advocated for better quality and palatability of the meals, and felt the updated regulations were a step towards improvement of the meals. To increase the students' acceptance towards the updated regulations and increase satisfaction, students suggested facilitating more test tastings, shifting towards more scratch cooking and fresher food items, increasing communication, and engaging the students in the program (Asada et al., 2017).

In addition, school nutrition professionals feared the updated regulations would decrease participation in the school lunch program (Cohen et. al, 2012). However, Turner and Chaloupka found the school food service staff perceived little change in the overall student behavior in lunch consumption and purchasing behaviors (Turner & Chaloupka, 2014). Respondents strongly agreed students initially complained about the meals (13.7%) whereas 63.2% agreed most students were no longer concerned about the meals after they grew familiar with the changes (Turner & Chaloupka, 2014). A small percentage (4.3%) of the respondents perceived fewer students were purchasing lunch or that participation did not change significantly (Turner & Chaloupka, 2014). The study reflected that the new guidelines did not affect the students' participation and they eventually adapted to the new guidelines.

In addition to factors influencing satisfaction, it is important to understand the reasons why students choose to participate or to not participate. Smith and colleagues (2015) used two surveys *Middle/Junior High School Student Participation Survey* (participated three or more days per week) and *Middle/Junior High School Non-Participation Survey* (participated fewer than three days per week) developed by the National Food Service Management Institute (NFSMI), to determine middle school students' satisfaction with school lunch. Statements that were addressed in participation survey focused on food preference, staff attentiveness, and lunch experiences.

Statements the students agreed with most when they ate lunch were that they got to socialize with their friends (86.2%), the food choices change every day (69.8%), and the menu offers healthy choices (64.9%) (Smith, Cunningham, & Auld, 2015). Statements with the lowest agreement were the food tasting homemade (21%), the staff listening to their suggestions (28.8%), and the food looks appealing (33.4%) (Smith et al., 2015). In addition, only 30-50% participating students agreed with statements within food preferences implying that visual appeal, aroma, and taste of the food needed improvement (Smith et al., 2015). Also, students were generally satisfied with the staff performance, however, felt their suggestions for improvements were disregarded.

For the non-participating students, the statements with which the majority agreed were long lines, (87%), prefer food from home (77.8%), and the food does not look appealing (67.1%) (Smith et al., 2015). Statements with the lowest level of agreement were not sitting with friends (14.1%), same food is served every day (22.1%), and unfriendly staff (27.1%). Specific to food preference, 50% agreed the food did not taste good or look fresh or appealing (Smith et al., 2015). Less than 1/3 of the students agreed with negative statements regarding customer service, indicating the staff was not a primary reason for not participating (Smith et al., 2015). Understanding why students choose to participate or not participate can aid the school nutrition professionals to identify students' attitudes and satisfaction with the school lunch program so they can make improvements accordingly (Smith et al., 2015).

Similar to parents and guardians, little research has been conducted with administrators and faculty and their perceptions on school lunches. However, the Oklahoma Technical Assistance Center surveyed school administrators about issues related to health and health education including physical education and school lunch regulation changes (TSET, 2015). Administrators' complained that the changes were too focused on decreasing portion sizes, as a result, they felt that the teens were not getting enough food. They believed the students did not

like the food offered which led to decreased consumption of school food, resulting in waste or hunger. They agreed students need healthy food, however, the taste should be appealing for students to want to consume school lunch. Positive comments applauded the cafeteria employees and food service contractors. They saw positive changes when higher quality ingredients were purchased, better trained cooks who were experienced with school menus, and employees who established a relationship with students when introducing new foods. The mixed responses stated that some changes such as the increased fruit and vegetable offerings were positively received while others were less favorable such as the reduction in entrée portion sizes and use of whole wheat bread products (TSET, 2015).

Similarities Between Food Service Industry and School Nutrition

No doubt, a school's nutrition program is a business much like the food service industry. To thrive, it is important to understand factors influencing attitudes and perceptions of satisfaction and that contribute to behavioral intentions of purchasing the food. A contributing factor is high quality customer service which can be defined as responsiveness, reliability, attentiveness and friendliness towards the consumer. It has been shown that good customer service and perceived service quality can lead to satisfaction (Ryu, Lee, & Kim, 2012). A customer's attitude toward a product is mediated by the person's current dissatisfaction or satisfaction. Customer satisfaction has positive effects on the attitudes and perceptions on a product or service. The outcome of customer satisfaction may influence a customer's decision and the behavioral intent to purchase the product. A satisfied customer is more likely to have intentions on repurchasing, remaining loyal and being content (Namkung & Jang, 2007). Food service establishments such as restaurants identified food quality as a fundamental aspect of a satisfied customer experience. Other factors included presentation of the food, a variety offered, healthy options, tastiness, freshness, and temperature that can contribute to food quality

(Namkung & Jang, 2007). Namkung and Jang (2007) showed evidence that food quality significantly affected customer satisfaction and behavioral intentions. In addition, the relationship between food quality and customer behavioral intentions was mediated by satisfaction. Overall, if the customer was satisfied by food quality it can influence the intentions of repurchasing (Namkung & Jang, 2007).

The concept of improving food quality can apply to the school lunch program to increase satisfaction and perceptions of students. The Institute of Child Nutrition (2013) identified two main factors influencing low participation was food quality and customer service. Students wanted better tasting food, better quality food, more food choices they liked, and fresher looking food (Rushing, 2013). In addition, customer service such as cleanliness, good communication with the students and the menu influence the students' satisfaction. Students would be more likely satisfied if food quality was improved which would influence their behavioral intentions of repurchasing school lunch. If the school could provide nutritious meals while satisfying the students, the students would more likely purchase healthy foods through the exposure from the school meals and mold their dietary habits.

Chef-based Interventions

Many uncertainties emerged after the implementation of the updated regulations and meal patterns, resulting in school nutrition professionals requesting guidance and training to prepare new school lunch meals. Some schools tested a chef-based intervention to improve the cooking techniques of school nutrition professionals. Chefs were found to be natural teachers who are passionate and knowledgeable about cooking techniques and ingredients making them a key component to a chef-based intervention (Condrasky & Griffin, 2010). It can be beneficial having a chef present to increase culinary knowledge and guide school nutrition professionals to prepare meals consisting with the Dietary Guidelines. The Cooking with the Chef (CWC) program

provided chef training for school nutrition professionals to boost culinary skills and confidence to prepare healthier meals (Condrasky et al., 2014). After implementing the CWC program, researchers found school nutrition professionals had an increase of confidence in culinary skills such as steaming, sautéing, roasting, using herbs/spices, and knowledge of culinary techniques (Condrasky et al., 2014). Chefs can increase self-efficacy by encouraging and motivating school nutrition professionals to be confident in their cooking capabilities (Condrasky & Griffin, 2010). The chefs bring an element of passion for cooking and inventive ways to create healthy meals (Condrasky & Griffin, 2010). This study has shown that using a chef-model to teach and train others can be valuable and effective.

Another chef-based intervention was “Chefs Move to Schools” (CMTS) program that started in May 2010, in which chefs were paired with schools to provide culinary advice to school nutrition professionals and teach children nutrition and food preparation (Just et al., 2014). CMTS’s goal was to increase the selection and consumption of healthy foods by using ingredients found in a school kitchen to design meals that were highly nutritious and more appealing. The chefs modified 4 main dishes with side salads that met the HHFKA guidelines which resulted in increasing lunch sales in high schools, and vegetable consumption. Additionally, high school students were more likely to select the chef-prepared pizza, suggesting the presence of a chef can potentially increase participation and availability of nutritious foods (Just et al., 2014).

In Boston, cafeteria staff felt they lacked the skills to prepare healthier foods and that a chef collaboration could educate them on the skills to improve food palatability, nutrient content, and quality of the school meals. A two-year pilot study was conducted to evaluate the Chef Initiative program that employed a professional chef to train cafeteria staff in schools to increase the availability and consumption of healthier school foods (Cohen et al., 2012). A healthier meal was defined by having more whole grains, fresh/frozen fruits and vegetables, and less salt, sugar,

saturated fats, and trans fat. Objectives were to “replace trans and saturated fat with unsaturated fats, reduce added sugar and salt, and increase whole grains and fiber” (Cohen et al., 2012, pg. 927). The chefs developed recipes, planned menus and trained the staff to create healthier, flavorful meals in two Boston middle schools. They provided the food preparation techniques to the staff that emphasized scratch cooking, palatability, and healthiness. To evaluate the program, evaluators compared a control school (C) that received standard Boston Public School meals and the Chef Initiative (CI) school. The CI school provided the students with more whole grains, fresh and frozen vegetables, and fresh fruit than the C school. The students at the CI school selected more whole grains and ate more servings of vegetables than the C school. Milk and fruit percentage were similar at both schools (Cohen et al., 2012). The results show that training the staff to provide healthy flavorful meals may improve food choices of the students with little effect on participation.

Cooking for Kids Program

The Cooking for Kids: Culinary Training for School Nutrition Professionals places chefs in Oklahoma school districts to provide assistance in better meeting updated school meal patterns while offering meals that are appealing to students. The program’s primary goals include: 1) increased use of scratch or fast scratch cooking methods 2) increased student participation 3) improved stakeholder perception of school nutrition. The secondary goals are 1) increased numbers of staff meeting USDA continuing education requirements and 2) decreased plate waste. The program provides culinary training and consulting to aid schools to meet federal guidelines with fresher ingredients and healthier meals.

The program includes culinary skill development consisting of three-day hands on training. School nutrition professionals learn to experiment with new flavors using less salt and

taste new recipes. They also learn and practice food safety, knife skills and mise en place while exploring a variety of methods to cooking whole grains and vegetables.

School districts that have staff who attend skill development training can apply for an on-site chef consultant at no charge to the school district. The consulting chef works closely with the school to assess the needs and create an action plan for the school district. Chefs visit the school nine to ten times throughout the school year to implement training to focus on developing the menu, work schedule, and developing and implementing a marketing plan. They also assessed their procurement practices and equipment to educate the staff on purchasing better ingredients within the school budget. Previous *Cooking for Kids* evaluation studies with school lunch professionals reflected an increase use of mise en place, use of *Smarter Lunchroom* strategies, a trend towards more scratch cooking, and increased students' consumption of fruits and whole grains (Powell, 2017; Till, 2017).

Social Ecological Model

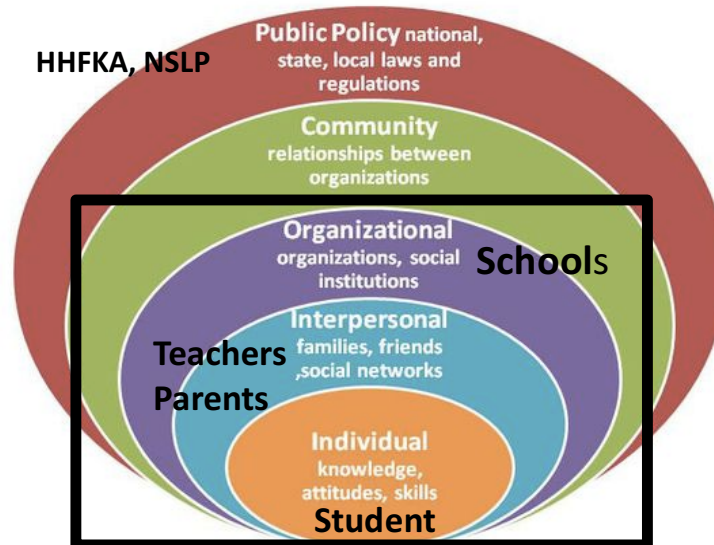
Successful public health programs tend to be based on a theoretical foundation to help explain and predict health behaviors (Glanz & Bishop, 2010). The Social Ecological Model (SEM) is a theoretical framework often used in health promotion and consists of influential factors at individual, interpersonal, organizational, community and system levels (Centers for Disease Control and Prevention, 2013). The theory assumes behavior change will come from combined efforts at multiple levels.

The SEM has shown that implementation of changes at different levels can be effective in increasing positive eating and physical activity behaviors. Schools that implemented school wellness policies to enhance students' healthier options resulted in children purchasing higher dietary quality foods during school meals (Office of Disease Prevention and Health Promotion,

2015). Using the SEM to develop interventions can potentially improve the health of a school by changing the environment and in turn influencing a person's food choices (Office of Disease Prevention and Health Promotion, 2015).

This study focused on changing the stakeholders' satisfaction of school lunches through implementation of a chef intervention. The project was in response to the federal policy known as the Healthy Hungry Free Kids Act and National School Lunch Program regulations aimed to changing the school nutrition environment by increasing access to healthy and appealing foods. Theoretically, implementation of the policy in a way that meets stakeholders' expectations can potentially influence the students' perception and increase their overall satisfaction with school lunch. Refer to Figure 2.1.

Figure 2.1 Social Ecological Model for Cooking for Kids Satisfaction Evaluation Study



Source: Center for Disease Control (CDC)

Satisfaction Surveys from the Institute of Child Nutrition

The Institute of Child Nutrition (ICN), formerly known as the National Food Service Management Institute, developed a Middle/High School Student Survey to measure the impact of perception and satisfaction with the school lunch program (Rushing, 2013). Assessing factors that influence students' satisfaction and addressing their concerns can empower the students and may influence their decision to participate in school lunch. Students' feedback can identify areas of improvement and develop strategies to increase participation and satisfaction. The researchers provided surveys to those who participated in school lunch and non-participants. In the participant survey, ICN identified that satisfaction was attributed to food preferences and staff attentiveness. Food preference included aspects of food served such as aroma, appearance, quality, variety, and freshness. Staff attentiveness included the interactions with students such as friendliness, positive attitudes and listening to the students. The non-participants survey identified factors that contributed to low participation were food quality and customer service. Food quality included taste, likeability, food recognition, properly cooked food, and healthiness. Customer service included cleanliness, menu, and communication with the students. By identifying the factors that influenced satisfaction and perception the researchers developed surveys that school nutrition professionals and researchers can use to improve school lunches (Rushing, 2013).

CHAPTER III

METHODOLOGY

A goal of *Cooking for Kids* is to improve school stakeholders' perception of the school meal program in Oklahoma. The purpose of this study was to evaluate the impact of the on-site chef consult phase of *Cooking for Kids* on stakeholders' perceptions of the school meal program. For this study, the stakeholder groups included students, parents and school administrators and faculty. The study was conducted in twenty-five Oklahoman school districts during the School Year 2016-2017. The study was approved by the Oklahoma State University Institutional Review Board (appendix D).

Description of Intervention

During the School Year 2016-2017, *Cooking for Kids* implemented a chef consultation intervention at twenty-four school districts to increase the culinary management and skills of school nutrition professionals. The intervention focused on increasing fast scratch cooking methods, using fresher ingredients in entrees and through use of salad bars, and implementing Smarter Lunchroom marketing strategies. By implementing these strategies, it was hypothesized that stakeholders' perception and satisfaction of school lunches would be positively affected

Data Collection of Satisfaction Surveys

Cooking for Kids researchers adapted satisfaction surveys based on the Institute of Child Nutrition's participation survey and on peer-reviewed literature reporting factors that influence school meal satisfaction (Rushing, 2013). Factors included food quality, food preferences, and lunch dining experience. A survey was developed for each of the three stakeholder groups: middle/high school students, parents/guardians, and administration/faculty. Each survey consisted of seven questions, demographic information, and an additional comment text box (appendix A, B, C). Questions related to satisfaction addressed freshness, taste, variety, healthiness, appeal, menu, and lunch environment. Study participants responded using a 5 point Likert scale where 1=strongly disagree and 5=strongly agree. Demographic information slightly differed between surveys, but generally consisted of questions that addressed grade, school district, frequency of school meal consumption, and gender.

Schools districts distributed satisfaction surveys to middle/high school students, parents and guardians, and administrators and faculty prior to the chef consultation (Fall 2016) and at post consultation (May 2017). Schools had the option of an electronic format in Qualtrics software (Qualtrics, 2015) or printed paper copies. Researchers exported the electronic responses into the SPSS data analysis software program (IBM SPSS Statistics, Version 20; Copyright ©) 2011). Paper surveys were mailed to researchers and data were entered into the same database by trained research assistants. The same process was repeated for the post surveys. To maximize response rates, schools were sent an email one week prior to the distribution of surveys and phone calls were made one week before the assigned deadline. To reduce burden on schools for returning paper surveys, pre-paid shipping labels were provided by *Cooking for Kids*. Enrollment and total free/reduced eligibility data were obtained from the Oklahoma State Department of Education's 2017 Low Income Report (Oklahoma State Department of Education, 2017).

Statistical Analysis

Statistical analyses were conducted using Statistical Package for Social Sciences (SPSS) 20.0 for each stakeholder group: parents/guardians, administrators/faculty, middle/high school students. To better understand the impact of participation and the intervention on satisfaction each respondent was categorized by a level of participation. Survey participation was collapsed and recoded from Everyday into Always Participated (code 2); 1-2 days and 3-4 days into Sometimes Participated (code 1); and Never into Never Participated (code 0). Within the parent/guardian survey, the “don’t know” responses were merged with the “neutral” responses. In addition, the child’s participation was used rather than the parents’ participation. A two-way, between- groups 2 x 3 factorial ANOVA was used to assess change in satisfaction prior to the chef consult and after the intervention. The dependent variables used in the univariate analysis included each of the individual satisfaction factors and overall satisfaction. Overall satisfaction $(Q1 + Q2 + Q3 + Q4 + Q5 + Q6 + Q7 / 7)$ was computed by summing the factors and dividing by 7. Satisfaction was coded from Strongly Agree (5) to Strongly Disagree (1). The two fixed factors were Participation and Pre/Post. Tukey post hoc was used to determine where the differences occurred between participation groups. When the Levene’s Test for Equality violated the test for homogeneity, an ordinal regression was conducted and R^2 was reported.

Qualitative Analyses

The Chi-Square Test was the statistical analysis performed in SPSS to evaluate the stakeholders’ comments. Respondents’ comments were coded into three categories: negative (1), neutral (2), and positive comments (3). To ensure the reliability of the coded comments, a second researcher familiar with the study coded 10%-20% of comments. An inter-rater reliability with intra-class correlation found the codes to be reliable: intra-class correlation for middle/high school was 0.803, administration/faculty was 0.902, and parents/guardian was 0.936.

Thematic analysis was used to identify themes within the comments for each stakeholder. The comments were coded with themes related to satisfaction or dissatisfaction such as taste, appeal, freshness, healthiness, variety, school menu, salad bar, school nutrition staff, or portion size. Frequency analysis was then used to identify the most common themes pre- and post- chef intervention between those that never, sometimes, and always participated

CHAPTER IV

FINDINGS

Data reported in the findings were obtained from satisfaction surveys completed by middle/high school students, parent/guardian and administrators/faculty before and after the *Cooking for Kids* chef-consultation intervention. The objective was to identify if the intervention influenced students', parents', and administrator/faculty's perceptions of and satisfaction with the school meal program.

Response Rates

Twenty-four school sites participated in the chef consultation for the School Year 2016-2017. Seventeen of the twenty-four sites (70.8%) distributed the both the pre-chef consult satisfaction surveys in Fall 2016 and the post-chef consult satisfaction surveys in Spring 2017. School sites that did not submit both pre- and post-survey responses to the researchers were not included in the evaluation. A total of 2435 pre-surveys and 1385 post- surveys were analyzed for middle and high school students. A total of 474 pre-surveys and 186 post- surveys were analyzed for parents and guardians. A total of 198 pre-surveys and 166 post-surveys were analyzed for administrators and faculty.

Demographics

Of the 17 schools submitting both pre- and post-satisfaction surveys, nine had one kitchen site that served all students enrolled in the district (eight served K-12th grades and one dependent school served K-6th grades). It should be noted that in these districts all parents and administrators/faculty were surveyed, but only the middle/high school students were surveyed. The remaining eight districts had school sites serving only middle or high school age students (i.e., grades 6th-8th, 7th-8th or 9th-12th grades). In these sites, all of the students, parents and administrators/faculty were surveyed and included in the study. Across all school sites, enrollment ranged from 59 to 1,356 students. 13 of the 17 school sites had 50% or more of students eligible for free and reduced-price meals. Demographic information is summarized in Table 4.1.

4.1 Lunch Satisfaction Survey Response Rates and Demographic Characteristics of *Cooking for Kids* Chef Consult School Sites: 2017 SY

School	Grade Level	Enrollment SY 2016 -2017 School District (MS/HS)	Total Free/Reduced ^b	Middle/High School Students ^c		Parents/Guardians		Admin/Faculty ^e	
				Pre n= 2435	Post n= 1385	Pre n= 474	Post n= 186	Pre n= 198	Post n= 166
School 1	7 th -8 th	492	60%	70%	36%	7%	1%		
School 2	6 th -8 th	189	46%	62%	42%	24%	22%		
School 3	K-12 th	200 (59) ^a	45%	105% ^d	8% ^d	183% ^d	5% ^d	20	23
School 4	9 th -12 th	464	74%	2%	22%				
School 5	7 th -8 th	253	31%	84%	51%			28	12
School 6	9 th -12 th	522	78%	62%	1%	24%	13%		
School 7	K- 6 th	425	69%					17	16
School 8	K-12 th	390 (159) ^a	69%					9	13
School 9	K-12 th	376 (99) ^a	82%			47% ^d	43% ^d		
School 10	9 th -12 th	201	59%	78%	59%	29%	8%	54	13
School 11	K-12 th	572 (190) ^a	74%					7	21
School 12	9 th -12 th	828	64%	16%	0.1%				
School 13	9 th -12 th	392	94%	91%	102%			4	19
School 14	K-12 th	164	56%	16%	17%			6	19
School 15	K-12 th	1344	58%	9%	7%				
School 16	K-12 th	1356 (687) ^a	43%	78% ^d	27% ^d			46	5
School 17	K-12 th	251 (142) ^a	67%	32% ^d	32% ^d	58% ^d	16% ^d	7	3

^a Districts with 1 kitchen site (K-12th grades and K-6th grades) include enrollment for the school district as well as the middle/high school (MS/HS).

^b Total free/reduced eligibility of district site (source: OSDE)

^c Percent of middle and high school enrollment completing the survey.

^d Percent of district enrollment for K-12th and K-6th grades kitchen sites.

^e Number of pre- and post-chef consult survey responses from administrators and faculty

Middle and High School Students

The majority of middle and high school students completing the school lunch satisfaction survey reported sometimes (36% pre, 43% post) or always participating (45% pre, 37% post) in the school lunch program. Students who reported they never participated comprised 19% of responses at pre- intervention and 20% at post- intervention.

After the 9-month chef consultation, there was no significant interaction of middle and high school students' overall satisfaction with the school lunch program by participation in NSLP at pre- and post-chef consult ($p = 0.54$). While there was no main effect of pre/post satisfaction ($p = 0.84$), there was a significant difference in satisfaction by participation ($p < 0.001$). The data are reported in Table 4.2.

Table 4.2 Comparison of Middle/High School Students' Satisfaction Factors with School Lunch Program by Participation in NLSP at Pre/Post Chef Consult

	Corrected Model P-value^a	Pre*Post p-value^a	Participation p-value^a	Pre/Post Participation p-value^a	Pseudo R^{2c}
Q1. The food in the cafeteria is fresh.	<0.001	0.86	<0.001	0.35 ^b	0.044
Q2. The food in the cafeteria tastes good.	<0.001	0.40	<0.001	0.78 ^b	0.065
Q3. There is a variety of food choices.	<0.001	0.94	<0.001	0.04 ^b	0.041
Q4. The menu offers healthy choices.	<0.001	0.51	<0.001	0.24	
Q5. The food looks appealing.	<0.001	0.32	<0.001	0.32 ^b	0.051
Q6. The menu has food I like.	<0.001	0.84	<0.001	0.43	
Q7. I get to socialize with my friends.	<0.001	0.35	<0.001	0.03 ^b	0.020
Overall satisfaction	<0.001	0.89	<0.001	0.54	

The statistical analysis was a two-way between-groups analysis of variance.

^a Level of significance set at ($p < 0.05$)

^b Levene's test of equality violated the assumption of homogeneity.

^c An ordinal regression was conducted for p-values that violated the test of homogeneity.

There was a significant difference in total mean satisfaction based on participation ($p < 0.001$). The Tukey post hoc analyses showed students who always participated had a statistically higher overall satisfaction total mean score (3.4 ± 0.9) compared to students who sometimes participated (3.1 ± 0.8) or never participated (2.8 ± 0.8). Likewise, students who sometimes participated had a higher total mean overall satisfaction score compared to students who never participated. The data are summarized in Table 4.3.

Consistent with overall satisfaction, each of the scale item total mean scores were statistically different between groups ($p < 0.001$), with students who reported always participating having higher scores compared to those reporting sometimes participating and never participating, and those who sometimes participated having higher total mean scores than students reporting never participating. The satisfaction scale item with the highest total mean score across all three participation groups was Q7, “I get to socialize with my friends” (range of 4.4 to 4.0, respectively). The scale item with the lowest total mean score was Q5 “The food looks appealing” (range of 2.8 to 2.2, respectively). The remaining items Q1, Q2, Q3, Q4, and Q5 ranged from 3.5 to 2.2, respectively. The data are summarized in Table 4.3 and Figure 4.1.

Table 4.3 Comparison of Mean Satisfaction Factors among Middle/High School Students by Participation Group at Pre- and Post- Chef Consult

Satisfaction Factors	Never Participated					Sometimes Participated					Always Participated				
	Pre		Post		Total Mean	Pre		Post		Total Mean	Pre		Post		Total Mean
	Mean ± Sd ¹	n= 464 ²	Mean ± Sd ¹	n= 276 ²	± Std ¹	Mean ± Std ¹	n= 878 ²	Mean ± Std ¹	n= 602 ²	± Std ¹	Mean ± Std ¹	n= 1093 ²	Mean ± Std ¹	n= 507 ²	± Std ¹
Q1.The food in the cafeteria is fresh.	2.5 ±1.1	448	2.6 ±1.0	273	2.5 ±1.1 ^a	2.9 ±1.2	872	2.8 ±1.1	600	2.8 ±1.1 ^b	3.1 ±1.2	1090	3.1 ±1.1	507	3.1 ±1.2 ^c
Q2.The food in the cafeteria tastes good.	2.4 ±1.1	446	2.5 ±1.1	272	2.8 ±1.2 ^a	2.8 ±1.2	872	2.8 ±1.2	597	2.8 ±1.2 ^b	3.2 ±1.2	1080	3.2 ±1.1	502	3.2 ±1.2 ^c
Q3.There is a variety of food choices.	2.6 ±1.1	442	2.7 ±1.1	271	2.7 ±1.1 ^a	3.0 ±1.8	875	3.0 ±1.2	596	3.0 ±1.2 ^b	3.3 ±1.2	1083	3.1 ±1.2	503	3.2 ±1.2 ^c
Q4.The menu offers healthy choices.	2.9 ±1.1	447	3.1 ±1.1	272	2.9 ±1.2 ^a	3.3 ±1.1	875	3.3 ±1.1	598	3.3 ±1.1 ^b	3.5 ±1.1	1081	3.5 ±1.1	506	3.5 ±1.1 ^c
Q5.The food looks appealing.	2.1 ±1.1	447	2.2 ±1.1	273	2.2 ±1.1 ^a	2.5 ±1.2	873	2.4 ±1.2	596	2.5 ±1.2 ^b	2.9 ±1.3	1081	2.8 ±1.2	504	2.8 ±1.3 ^c
Q6.The menu has food I like.	2.4 ±1.1	450	2.5 ±1.1	273	2.4 ±1.1 ^a	2.9 ±1.2	868	2.9 ±1.2	599	2.9 ±1.2 ^b	3.3 ±1.2	1079	3.3 ±1.2	505	3.3 ±1.2 ^c
Q7.I get to socialize with my friends.	4.1 ±1.1	450	3.9 ±1.2	274	4.0 ±1.6 ^a	4.3 ±1.0	876	4.3 ±1.0	602	4.3 ±1.0	4.3 ±1.0	1088	4.4 ±0.9	506	4.4 ±1.0 ^c
Overall Satisfaction	2.7 ±0.9	429	2.8 ±0.8	264	2.8 ±0.8 ^a	3.1 ±0.9	844	3.1 ±0.8	578	3.1 ±0.8 ^b	3.4 ±0.9	1037	3.3 ±0.8	491	3.4 ±0.9 ^c

¹Scale of 1 to 5 with 1 = strongly disagree, 5 = strongly agree,

²N equal the number of responses for each satisfaction factor within participation groups.

^{a,b,c} Difference in letter superscripts indicate significance difference in total means (p<0.05).

Qualitative Data. A Chi-square crosstab analysis was used to evaluate if the proportion of negative versus positive comments changed from pre- to post- chef consult. The majority of the middle/high school students' comments were negative at both pre- and post- intervention (68% pre- and 69% post-). Further, there was not a significant shift in negative to positive comments from pre- to post- chef consult intervention ($p = 0.89$). The data are summarized in Table 4.4.

Table 4.4 Chi-square Crosstabs Analysis on Middle/High School Students' Comments Before and After Chef Consult

	Negative Comments	Neutral Comments	Positive Comments	Pearson Chi- Square (p-value)	Cramer's V
Pre- intervention N=662	68%	14%	19%	.89	.89
Post- intervention N=320	69%	13%	18%		

The statistical performed was a Chi-Square test for Independence.

Pearson Chi-Square ($p < 0.05$)

Cramer's V criteria for effect size: small=.01, medium= .30, and large= .50

Within the middle/high school student surveys, a total of 982 pre- and post- comments were used for analyses with 666 negative comments (69%), 129 neutral comments (13%), and 187 positive comments (19%). At pre- and post-intervention, the two most common themes among students who reported never participating in the school lunch program were 1) the food did not taste good and 2) was not appealing. A comment reflecting these perceptions is:

"I do not eat the school food much but I have tried it before. I think perhaps we could have better non-processed foods. It is not healthy, perhaps a cleaner and better environment and more choices than just salad."

In addition to disliking the taste of food, other common themes of students who reported

sometimes participating were variety and wanting better food. Example comments include:

“fresh, not reheated, better quality, better spices,” and

“need more food choices and better tasting.”

Taste was also a common theme among students who reported always participating. However, at both pre- and post-intervention there were similar percentages of students who reported the food tasting good compared to the percentage of participating students who commented the food does not taste good. It is interesting to note, that the highest percentage of comments at pre-intervention was the food did not taste good, compared to post-intervention where the highest percentage was the food tasted good. Other notable themes reflected participating students wanted better and more appealing food. Example comments include:

“the food is amazing I am well fed and it tastes really good,” and

“I understand the importance of healthy eating, but creating food designed to be healthy but lacks in taste is not a good way to distribute nutrients because if food is visually and tastefully unappealing then the people who really need the nutrients will not eat it because of the opinion of other students and of themselves...If you fix the taste and visual appeal of the food, more people will eat it.”

The data are summarized in Table 4.5.

Table 4.5 Middle and High School Students' Comment Themes Pre- and Post-Chef Consult by Participation in NSLP Group

	Pre- Comment Themes	Post- Comment Themes	Stakeholder's Quotes
Never Participated (Pre=121 Post= 50)	1) Food doesn't taste good (20%, n=24). 2) Need better food (7%, n=8).	1) Food doesn't taste good (22%, n=11). 2) The food is unappealing (10%, n=5).	<i>"I do not eat the school food much but I have tried it before. I think perhaps we could have better non-processed foods. It is not healthy, perhaps a cleaner and better environment and more choices than just salad."</i>
Sometimes Participated (Pre=267 Post=149)	1) Food doesn't taste good (15%, n=41). 2) Need better food (12%, n=32). 3) There is not a variety of food choices (9%, n=24)	1) Food doesn't taste good (25%, n=37). 2) Need better food (13%, n=20) 3) There is not a variety of food choices (11%, n=16).	<i>"fresh, not reheated, better quality, better spices"</i> <i>"need more food choices and better tasting"</i>
Always Participated (Pre=347 Post= 158)	1) Food doesn't taste good (13%, n=45). 2) The food taste good (12%, n=42). 3) Need better food (9%, n=31).	1) The food taste good (17%, n=27). 2) Food doesn't taste good (16%, n=25). 3) Food is unappealing (7%, n=11).	<i>"the food is amazing I am well fed and it tastes really good"</i> <i>"I understand the importance of healthy eating, but creating food designed to be healthy but lacks in taste is not a good way to distribute nutrients because if food is visually and tastefully unappealing then the people who really need the nutrients will not eat it because of the opinion of other students and of themselves...If you fix the taste and visual appeal of the food, more people will eat it"</i>

Highest frequencies of comment themes found pre- and post- chef intervention for each participation group (%).

Parents and Guardians

Among the parents and guardians who completed the school lunch satisfaction survey, the largest proportion reported their child always participated in the school lunch program (61% pre, 45% post). This was followed by parents who reported their child sometimes participated (26% pre, 30% post). The fewest responses came from parents who reported their child never participated in the school lunch program (13% pre, 25% post).

There was a trend towards a significant interaction of parents' and guardians' overall satisfaction with the school lunch program by participation groups from pre- to post-intervention ($p = 0.07$). There was a significant improvement in overall satisfaction for the main effect of pre- to post-intervention ($p=0.010$). This change was driven by three of the seven scale items: Q2 "the food in the cafeteria taste good" ($p=0.004$), Q3 "there is a variety of choices" ($p<0.001$), Q6 "the menu has food my child likes" ($p=0.003$). Further, overall satisfaction between participation groups was significantly different ($p<0.001$). The data are reported in Table 4.6.

Table 4.6 Comparison of Parents' and Guardians' Satisfaction Factors with School Lunch Program by Child's Participation in NLSP and Pre/Post Chef Consultation

	Corrected Model P-value ^a	Pre/Post p-value ^a	Participation p-value ^a	Pre/Post * Participation p-value ^a	Pseudo R ² ^c
Q1. The food in the cafeteria is fresh.	<0.001	0.24	<0.001	0.10	
Q2. The food in the cafeteria tastes good.	<0.001	0.004	<0.001	0.23	
Q3. There is a variety of food choices.	<0.001	<0.001	<0.001	0.05 ^b	0.046
Q4. The menu offers healthy choices.	<0.001	0.23	<0.001	0.08	
Q5. The food looks appealing.	<0.001	0.07	<0.001	0.65	
Q6. The menu has food my child likes.	<0.001	0.003	<0.001	0.16	
Q7. I feel good about my child eating in the cafeteria.	<0.001	0.15	<0.001	0.02	
Overall satisfaction	<0.001	0.010	<0.001	0.07	

The statistical analysis was a two-way between-groups analysis of variance.

^a Level of significance set at $p < 0.05$

^b Levene's test of equality violated the assumption of homogeneity.

^c An ordinal regression was conducted for p-values that violated the test of homogeneity.

Parents and guardians who reported their children always participated in the program had a statistically higher overall satisfaction total mean score of 3.5 ± 0.8 , compared to parents and guardians of students who sometimes participated (3.1 ± 0.9) and those who never participated (2.9 ± 0.8) ($p < 0.001$). There was no difference in overall satisfaction between parents and guardians of students who never and sometimes participated ($p = 0.14$). The data are summarized in Table 4.7.

The Tukey post hoc analysis identified similar differences in six of the seven scale items (Q1, Q2, Q3, Q5, Q6, and Q7). Parents and guardians of children who reported always

participating had higher total satisfaction scores than those who reported never or sometimes participating in the school lunch program ($p<0.05$), while total satisfaction scores were similar to those reporting never and sometimes participating. The data are summarized in Table 4.7. For scale item Q4 total mean scores were similar for parents of children who sometimes and always participated ($p=0.12$), but the two groups were statistically different compared to those whose children never participated ($p<0.05$). Figure 4.2 reflects that satisfaction scale item with the highest total mean score for those who reported never participating was Q1 “there is a variety of food choices” (3.2 ± 1.0) and the lowest total mean score was Q5 “The food looks appealing” (2.7 ± 1.0). Parents and guardians of children who reported their child sometimes participated and always participated lowest total mean score was Q5 “The food looks appealing” (2.8 and 3.1, respectively), and highest total mean score was Q4 “the menu offers healthy choices” (3.5 and 3.6, respectively).

Table 4.7 Comparison of Parents' and Guardians' Mean Satisfaction Factors with School Lunch Program by Child's Participation Groups at Pre- and Post- Chef Consult

Satisfaction Factors	Never Participated					Sometimes Participated					Always Participated				
	Pre		Post		Total Mean ± Std ¹	Pre		Post		Total Mean ± Std ¹	Pre		Post		Total Mean ± Std ¹
	Mean ± Std ¹	n= 60 ²	Mean ± Std ¹	n= 47 ²		Mean ± Std ¹	n= 124 ²	Mean ± Std ¹	n= 56 ²		Mean ± Std ¹	n= 290 ²	Mean ± Std ¹	n= 83 ²	
Q1.The food the cafeteria is fresh.	2.7 ±0.9	58	3.3 ±1.0	47	2.9 ±0.9 ^a	3.1 ±1.0	123	3.1 ±0.9	56	3.1 ±1.0 ^a	3.4 ±1.0	289	3.4 ±1.0	92	3.4 ±1.0 ^b
Q2.The food in the cafeteria tastes good.	2.5 ±0.9	58	3.0 ±1.0	46	2.8 ±1.0 ^a	2.9 ±1.1	122	3.0 ±0.9	56	3.0 ±1.0 ^a	3.3 ±1.0	288	3.5 ±1.1	82	3.3 ±1.0 ^b
Q3.There is a variety of food choices.	2.9 ±0.9	58	3.5 ±0.9	47	3.2 ±1.0 ^a	3.2 ±1.1	123	3.3 ±1.1	56	3.2 ±1.1 ^a	3.5 ±1.1	287	3.6 ±1.0	83	3.5 ±1.0 ^b
Q4.The menu offers healthy choices.	3.0 ±1.0	58	3.4 ±0.9	47	3.1 ±1.0 ^a	3.5 ±1.0	123	3.4 ±0.9	55	3.5 ±1.0 ^b	3.6 ±1.0	287	3.7 ±1.0	83	3.6 ±1.0 ^b
Q5.The food looks appealing.	2.5 ±0.9	57	2.8 ±1.1	47	2.7 ±1.0 ^a	2.8 ±1.1	122	2.8 ±1.1	56	2.8 ±1.1 ^a	3.1 ±1.0	289	3.2 ±1.0	83	3.1 ±1.0 ^b
Q6.The menu has food my child like.	2.6 ±1.0	58	3.1 ±1.1	47	2.8 ±1.1 ^a	2.8 ±1.2	122	3.2 ±1.1	56	2.9 ±1.2 ^a	3.4 ±1.1	286	3.5 ±1.2	83	3.4 ±1.1 ^b
Q7. I feel good about my child eating in the cafeteria.	2.7 ±1.0	58	3.2 ±1.0	47	2.9 ±1.0 ^a	3.2 ±1.2	123	3.2 ±1.0	56	3.2 ±1.1 ^a	3.7 ±1.1	290	3.5 ±1.1	83	3.6 ±1.1 ^b
Overall Satisfaction	2.7 ±0.8	57	3.2 ±0.8	46	2.9 ±0.8 ^a	3.1 ±1.0	121	3.1 ±0.7	55	3.1 ±0.9 ^a	3.4 ±0.8	278	3.5 ±0.9	82	3.4 ±0.8 ^b

¹Scale of 1 to 5 with 1 = strongly disagree, 5 = strongly agree

²N equal the number of responses for each satisfaction factor within participation groups.

^{a,b,c} Difference in letter superscripts indicate significance difference in total means (p<0.05).

Qualitative Data

The Chi-square crosstab analysis showed there was not a significant shift in negative to positive comments from pre- to post- chef consult intervention ($p=0.06$). While not statistically significant, the majority of comments at pre-intervention were negative (53%) compared to the majority of comments being neutral (58%) at post-intervention. The data are summarized in Table 4.8.

Table 4.8 Chi-square Crosstabs Analysis of Parent/Guardians' Comments Before and After Chef Consult

	Negative Comments	Neutral Comments	Positive Comments	Pearson Chi-Square (p-value)	Cramer's V
Pre-intervention n= 58	53%	29%	17%		
Post-intervention n=19	26%	58%	16%	.06	.06

The statistical performed was a Chi-Square test for Independence.

Pearson Chi-Square significance set at ($p<0.05$).

Cramer's V criteria for effect size: small=.01, medium= .30, and large= .50

Among the parents and guardian group, a total of 76 pre- and post-comments were recorded, with 36 negative comments (47%), 28 neutral comments (37%), and 13 positive comments (17%) used for analyses. Parents who reported their children never participated only commented that their student did not participate.

Common themes among parents who reported their children sometimes participated were related to the appeal and taste of the food. An example comment from this group of parents was:

"My child does not like school food at all...I would like my child to have food she enjoys,

food with more flavor, food that looks more appealing.”

The highest frequency of comments for pre- and post- intervention for parents who reported their children always participated were 1) parents do not eat school lunch and 2) the parents’ response was based on their child’s opinions. They also shared comments around the common themes of food tasting good, however, they would like to increase fruit selection. In contrast, negative common themes of those that reported always participating shared their children were 1) still hungry, 2) food is unappealing, and 3) food does not taste good. For those who reported their child always participating shared comments such as:

“Good comments from my two middle school age children. They like the variety of foods offered and have expanded the items eaten on the tray since fresh fruits and vegetables have been served.”

they also shared negative comments such as:

“Need healthier options and more choices!” and

“My kids don’t like the food at all.”.

The data are summarized in Table 4.9.

Table 4.9 Parents' and Guardians' Comment Themes Pre- and Post- Chef Consult by Participation Group

	Pre- Comment Themes	Post- Comment Themes	Quotes
Sometimes Participated (pre=16; post=7)	1) Food doesn't taste good (13%, n=2). 2) Food is unappealing (13%, n=2).	1) Child does not like school lunch (i.e. appeal and variety) (43%, n=3).	<i>"My child does not like school food at all...I would like my child to have food she enjoys, food with more flavor, food that looks more appealing"</i>
Always Participated (pre=33, post=11)	1) Food doesn't taste good (12%, n=4). 2) Child likes school lunch (12%, n=4). 3) Child is still hungry (12%, n=4). 5) Food is unappealing (12%, n=4).	1) Parents would like to see the addition of more fruit (27%, n=3). 2) Child likes school lunch (i.e. food taste good) (18%, n=2).	<i>"Good comments from my two middle school age children. They like the variety of foods offered and have expanded the items eaten on the tray since fresh fruits and vegetables have been served"</i> <i>"Need healthier options and more choices!"</i> <i>"My kids don't like the food at all".</i>

Highest frequencies of comment themes found pre- and post- chef intervention for each participation group (%).

Administrators and Faculty

The majority of administrators and faculty who completed the school lunch satisfaction survey reported sometimes (57% pre, 70% post) or always participating in the NSLP (17% pre, 14% post). Those who reported never participating comprised 27% at pre- and 16% at post-intervention.

After the 9-month study period, there was not a significant interaction of administrators' and faculty's overall satisfaction with the school lunch program by participation groups compared

to pre-intervention ($p = 0.85$). There was a significant improvement in the main effect of pre/post overall satisfaction ($p=0.010$). This change was driven by four of the seven scale items: Q1 “The food in the cafeteria is fresh.” ($p=0.03$), Q3 “there is a variety of food choices” ($p<0.001$), Q4 “the menu offers healthy choices” ($p=0.02$), and Q5 “the food looks appealing” ($p=0.04$). There was also a significant difference in satisfaction between the main effect of participation groups ($p<0.001$). The significant increase of satisfaction pre- to post- chef intervention and between participation groups accounted for 16% of the population. The data are reported in Table 4.10.

Table 4.10 Comparison of Administrators’ and Faculty’s Satisfaction Factors with School Lunch Program by Participation in NSLP and Pre/Post Chef Consultation

	Corrected Model P-value ^a	Pre/Post p-value ^a	Participation p-value ^a	Pre/Post* Participation p-value ^a	Pseudo R ² ^c
Q1. The food in the cafeteria is fresh.	<0.001	0.03	<0.001	0.68 ^b	0.126
Q2. The food in the cafeteria tastes good.	<0.001	0.09	<0.001	0.65 ^b	0.135
Q3. There is a variety of food choices.	<0.001	<0.001	<0.001	0.91 ^b	0.148
Q4. The menu offers healthy choices.	<0.001	0.02	<0.001	0.99 ^b	0.110
Q5. The food looks appealing.	<0.001	0.04	<0.001	0.80 ^b	0.140
Q6. The menu has food I like.	<0.001	0.47	<0.001	0.68 ^b	0.133
Q7. The quality of my lunch experience is good.	<0.001	0.20	<0.001	0.89 ^b	0.158
Overall satisfaction	<0.001	0.010	<0.001	0.85 ^b	0.162

The statistical analysis was a two-way between-groups analysis of variance.

^a Level of significance set at ($p<0.05$)

^b Levene’s test of equality violated the assumption of homogeneity.

^c An ordinal regression was conducted for p-values that violated the test of homogeneity.

Administrators and faculty who reported always participating in the program had the highest overall satisfaction total mean score (4.3 ± 0.7), compared to administrators and faculty who sometimes participated (3.8 ± 1.0), or those who never participated (3.1 ± 1.0) ($p < 0.001$). The data are summarized in Table 4.11.

The Tukey post hoc analyses identified differences in six of the seven scale items (Q2, Q3, Q4, Q5, Q6, Q7) ($p < 0.05$). Administrators and faculty who reported always participating had higher total mean scores for satisfaction compared to those who reported sometimes participating and never participating, and those that sometimes participated had higher satisfaction total mean scores than those reporting never participating. For scale item Q1, total satisfaction mean scores were similar for those administrators and faculty reporting sometimes and always participating ($p = 0.12$), however, those that reported never participating were statistically different compared to sometimes and always participating ($p < 0.001$). The data are summarized in Table 4.11.

The data summarized in Figure 4.3 and Table 4.11 reflects the satisfaction scale with the highest total satisfaction mean score for administrators and faculty who reported never participating was Q4 “the menu offers healthy choices” (3.5 ± 1.1), and the lowest total mean score was Q5 “the food looks appealing” (2.9 ± 1.3). Those that reported sometimes participating had the highest satisfaction total mean score for Q1 “the food in the cafeteria is fresh” (4.1 ± 1.0) and lowest total scores were Q5 “the food looks appealing” and Q6 “the menu has food I like” (3.63, respectively). Those that reported always participating had the highest total satisfaction mean score for Q4 “the menu offers healthy choices” (4.4 ± 0.9), and lowest total mean score for Q3 “there is a variety of food choices” (4.1 ± 1.0).

Table 4.11 Comparison of Administrators' and Faculty's Mean Satisfaction Factors with School Lunch Program by Participation Groups at Pre- and Post- Chef Consult

Satisfaction Factors	Never Participated					Sometimes Participated					Always Participated				
	Pre		Post		Total Mean ± Sd ¹	Pre		Post		Total Mean ± Sd ¹	Pre		Post		Total Mean ± Sd ¹
	Mean ± Sd ¹	n= 53 ²	Mean ± Sd ¹	n= 27 ²		Mean ± Sd ¹	n= 112 ²	Mean ± Sd ¹	n= 116 ²		Mean ± Sd ¹	n= 33 ²	Mean ± Sd ¹	n= 23 ²	
Q1.The food in the cafeteria is fresh.	3.4 ±1.2	40	3.6 ±0.8	19	3.4 ±1.1 ^a	3.8 ±1.1	112	4.3 ±0.8	116	4.1 ±1.0 ^b	4.2 ±1.0	33	4.5 ±0.7	23	4.3 ±0.9 ^b
Q2.The food in the cafeteria tastes good.	3.1 ±1.2	39	3.2 ±1.0	18	3.1 ±1.2 ^a	3.6 ±1.2	112	4.0 ±0.9	115	3.8 ±1.0 ^b	4.1 ±1.0	33	4.4 ±0.7	23	4.2 ±0.9 ^c
Q3.There is a variety of food choices.	2.7 ±1.3	41	3.4 ±1.2	19	3.0 ±1.3 ^a	3.3 ±1.4	110	4.0 ±1.0	116	3.6 ±1.3 ^b	3.9 ±1.2	33	4.4 ±0.7	23	4.1 ±1.0 ^c
Q4.The menu offers healthy choices.	3.4 ±1.1	40	3.7 ±1.0	19	3.5 ±1.1 ^a	3.8 ±1.1	111	4.2 ±0.9	116	4.0 ±1.0 ^b	4.3 ±1.0	33	4.6 ±0.6	23	4.4 ±0.9 ^c
Q5.The food looks appealing.	2.9 ±1.4	40	3.1 ±1.1	19	2.9 ±1.3 ^a	3.4 ±1.2	109	3.8 ±1.0	116	3.6 ±1.2 ^b	4.0 ±1.1	33	4.4 ±0.7	23	4.1 ±1.0 ^c
Q6.The menu has food I like.	3.0 ±1.3	41	3.1 ±1.3	19	3.0 ±1.3 ^a	3.5 ±1.2	112	3.7 ±1.0	115	3.6 ±1.1 ^b	4.4 ±0.8	33	4.3 ±0.7	23	4.3 ±0.8 ^c
Q7.The quality of my lunch experience is good.	2.9 ±1.2	39	3.1 ±1.1	19	2.9 ±1.2 ^a	3.6 ±1.2	112	3.9 ±1.0	116	3.8 ±1.1 ^b	4.3 ±1.0	33	4.4 ±0.7	23	4.3 ±0.8 ^c
Overall Satisfaction	3.0 ±1.1	38	3.4 ±0.8	18	3.1 ±1.0 ^a	3.6 ±1.1	106	4.0 ±0.8	114	3.8 ±1.0 ^b	4.2 ±0.9	33	4.4 ±0.6	23	4.3 ±0.7 ^c

¹Scale of 1 to 5 with 1 = strongly disagree, 5 = strongly agree

²N equal the number of responses for each satisfaction factor within participation groups.

^{a,b,c} Difference in letter superscripts indicate significance difference in total means (p<0.05).

Qualitative Data

The Chi-square crosstab analysis for administrators and faculty identified there was a significant shift in the proportion of negative to positive comments ($p=0.004$) after the chef consultation intervention. Positive comments increased from 33% at pre-intervention to 57% at post- intervention. The data are summarized in Table 4.12.

Table 4.12 Chi-square Crosstabs Analysis of Administrators' and Faculty's Comments Before and After Chef Consult

	Negative Comments	Neutral Comments	Positive Comments	Pearson Chi- Square (p-value)	Cramer's V
Pre- intervention N=80	40%	28%	33%	.004	.004
Post- intervention N=47	36%	6%	57%		

The statistical performed was a Chi-Square test for Independence.

Pearson Chi-Square level of significance set at $p<0.05$

Cramer's V criteria for effect size: small=.01, medium= .30, and large= .50

Administrators and faculty shared a total of 127 comments, with 49 negative (38%), 25 neutral (20%), and 53 positive (42%) comments. This stakeholder group had a significant shift from negative to positive comments after the chef intervention. Thematic analysis identified the common themes for those that reported never participating at pre- intervention were related to the 1) the food doesn't not taste good and 2) unappealing food. An example of a pre-intervention comment is:

“Would love to eat in cafeteria but menu is often wrong. Salad bar not restocked enough. Often times menu gets changed. Wish the food was made not canned or open out of bags.”

In comparison, a post-intervention a common theme was unhealthy foods such as use of processed foods. A comment reflecting this theme is:

“I do not find the food appealing. I see a lot of food go to waste because the students do not like it.”

Those who reported sometimes participating pre- and post- intervention expressed positive comments related to the salad bar and school lunch staff. In addition, there was a decrease in the frequency of comments related to the theme of unappealing food from n=5 at pre- to n=2 at post- intervention. Those who reported sometimes participating shared pre-intervention comments such as:

“The salad bar is a great improvement, as is the seasoning table. I like these. The main courses are very unappealing at times and some chili cheese fries, are remarkably unhealthy.”

In comparison, examples of post-intervention comments for those who reported sometimes participating were:

“I really enjoyed how fruit and salad bars are displayed. They are very appealing!”, and

“I think the cafeteria ladies have made a great improvement to their breakfast and lunch menus! They are also trying new foods out and I think that is a great idea!”

The comment theme with the highest frequency for pre- and post- intervention for those

who reported always participating was the food tastes good. After the chef intervention, there was an increase of comments related to the food tastes good (29% to 38%), and positive comments associated with the school lunch staff (21% to 23%). In addition, those who always participated shared positive comments related to the salad bar. Administrators and faculty who reported always participating shared comments pre-intervention such as:

“I think the food this year is great. It’s all homemade and the girls do a good job.”

Whereas post-intervention comments that reflected the comment themes of those reporting always participating were:

“Meals are great. Love the salad bar.”

“Our school lunches have improved this year. Many more choices and different options.”

“Much improvement from the past few years! I especially enjoy the fresh salad bar... You can really tell that the cafeteria staff cares about the students and the staff and wants everyone to enjoy breakfast and lunch.”

The data are summarized in Table 4.13.

Table 4.13 Administrators' and Faculty's Comment Themes Pre- and Post- Chef Consult by Participation Group Before and After Chef Consult

	Pre- Comment Themes	Quotes	Post- Comment Themes	Quotes
Never Participated (Pre= 27, Post= 4)	1) Food doesn't taste good (11%, n=3). 2) Food doesn't look appealing (11%, n=3).	<i>"Would love to eat in cafeteria but menu is often wrong. Salad bar not restocked enough. Often times menu gets changed. Wish the food was made not canned or open out of bags."</i>	1) Food is unhealthy (i.e. processed food) (38%, n=2).	<i>"I do not find the food appealing. I see a lot of food go to waste because the students do not like it."</i>
Sometimes Participated (Pre=34, Post= 33)	1) Positive comments related to the salad bar (24%, n=8). 2) Food is unappealing (13%, n=5) 3) Positive comments related to the staff (12%, n=4).	<i>"The salad bar is a great improvement, as is the seasoning table. I like these. The main courses are very unappealing at times and some chili cheese fries, are remarkably unhealthy."</i>	1) Positive comments related to the salad bar (24%, n=8). 2) Positive comments related to the staff (18%, n=6). 3) Food is unappealing (6%, n=2).	<i>I really enjoyed how fruit and salad bars are displayed. They are very appealing!"</i> <i>"I think the cafeteria ladies have made a great improvement to their breakfast and lunch menus! They are also trying new foods out and I think that is a great idea!"</i>

Highest frequencies of comment themes found pre- and post- chef intervention for each participation group (%).

Continue on next page.

Table 4.13 (Cont.) Administrators' and Faculty's Comment Themes Pre- and Post-Chef Consult by Participation Group Before and After Chef Consult

	Pre- Comment Themes	Quotes	Post- Comment Themes	Quotes
Always Participated (Pre= 14, Post= 8)	1) Food tastes good (29%, n=4). 2) Positive comments related to the staff (21%, n=3). 3) Positive comments related to the salad bar (21%, n=3).	<i>"I think the food this year is great. It's all homemade and the girls do a good job"</i>	1) Food tastes good (38%, n=5). 2) Positive comments related to the staff (25%, n=2). 3) Positive comments related to the salad bar (13%, n=1).	<i>"Meals are great. Love the salad bar"</i> <i>"Our school lunches have improved this year. Many more choices and different options".</i> <i>"Much improvement from the past few years! I especially enjoy the fresh salad bar... You can really tell that the cafeteria staff cares about the students and the staff and wants everyone to enjoy breakfast and lunch."</i>

Highest frequencies of comment themes found pre- and post- chef intervention for each participation group (%).

CHAPTER V

DISCUSSION AND CONCLUSIONS

The purpose of this study was to determine if a chef-lead culinary training program for school nutrition professionals affected the satisfaction of middle/high school students, parents/guardians, and administrators/faculty. While prior research has shown that chef interventions in school settings can increase culinary skills, improve self-efficacy, and provide guidance to school nutrition professionals to create healthy, appealing school meals (Cohen et al., 2012; Condrasky & Griffin, 2010), there has been little research measuring the effect on stakeholders' satisfaction and perceptions of the school meal program. The literature has shown when schools utilize a chef to improve school lunches by emphasizing scratch cooking, palatability and healthiness, it resulted in students consuming more whole grains and vegetables. This suggests that chef interventions have the potential to increase satisfaction (Cohen et al., 2012; Just et al., 2014; Powell, 2017).

This study measured satisfaction using a scale that included factors such as the freshness, taste, variety of choices, healthy choices, appeal, menu, lunch experience, and overall satisfaction of school meals. A second objective was to identify if non-participants and participants of th

school lunch program differed in satisfaction. Lastly, the project identified pre- and post-emergent themes from the survey comment section for each stakeholder group.

The majority of school nutrition stakeholders participating in this study reported they sometimes or always participated in the school lunch program. The primary finding of this study confirmed that stakeholders who regularly participate in the program were more satisfied than those who participated on an irregular basis or not at all. This finding is similar to another study conducted by Meyer and Conklin (1998) that found students who consumed school lunches more frequently reported greater satisfaction with the school lunch program compared to those who never participated.

Even though school lunch participants reported higher satisfaction, their level of satisfaction was best described as neutral for students and parents, and somewhat satisfied for administrators and faculty. Both the qualitative and quantitative findings point to taste and appeal as major influential factors, either positively or negatively, contributing to their satisfaction with school lunch meals. This finding is consistent with several studies concluding that taste and appeal were important to students in deciding whether to participate in school lunch or deciding which food items to eat (Asada et al., 2017; Castillo, 2011; Meyer, 2000b). Food that is presented in a visually attractive manner, and thus more appealing, tends to be more positively received and can increase the probability of liking that food item or flavor (Zellner, Loss, Zearfoss, & Remolina, 2014). Furthermore, the taste of food is a significant factor that influences meal satisfaction and behavioral intentions of participating in a meal (Namkung & Jang, 2007; Smith et al., 2015). As such, taste and appeal of food affects a school stakeholders' satisfaction and influences their decision to participate, or not participate, in school lunch.

The qualitative findings from this study also reflect the importance of appeal and taste on satisfaction, and was consistent across stakeholder groups. Common comments that provided

insight to the food's appeal, or lack of, were related to unappealing presentation, unhealthy choices, or low food quality. Consistent with these findings, Smith et al. (2015) and Castillo et al. (2011) found students decided to not participate in school meals because lack of food variety, unappealing food, and food quality (i.e. flavor, aroma, visual appeal, and freshness). Previous studies have stated parents choose to not have their children eat school meals due to nutritional quality, lack of control of their child's food, unhealthiness, and food quality (Bailey-Davis et al., 2013; Farris, 2016). This study seems to be the first to report that these same factors apply to administrators and faculty's decision on whether or not to eat school lunches. Our findings suggest those who participate more have a higher satisfaction in school meals, but there is still opportunity for progress. An approach to increasing participation in the school meals programs is to focus on taste, appeal, healthy choices, and food quality of meals which may influence them to change stakeholders' negative perceptions and increase satisfaction.

No doubt, students are an important stakeholder group for the school meal program. The school lunch program was created to provide students with nutritious meals every school day (USDA, 2016b); understanding their perceptions towards school meals can help school nutrition professionals meet the goals of the program. This is important in that past studies have shown that students who participate in the school lunch program have a better dietary quality compared to non-participants. Studies have also reported that school lunch participants consume less energy dense foods, desserts, snack items, sweeten beverages and more fruits, vegetables, and milk compared to non-participants (Briefel, Wilson, & Gleason, 2009; Condon, Crepinsek, & Fox, 2009). Furthermore, consuming school lunch has been associated with a better overall diet compared to those brought their lunches from home (Au, Rosen, Fenton, Hecht, & Ritchie, 2016). It seems that students who participate more in school lunch are more satisfied, tend to be exposed to healthier food options, and have a higher probability of consuming a larger variety of nutritious food groups. In this study, middle and high school-age students were least satisfied with the

appeal of the school food. This was supported by students' comments that reflected a desire for improvement of taste, appeal, and variety of school lunch food. Prior studies have supported these findings and found the primary reasons students choose to participate in school lunch are being able to socialize with their friends and food quality (Castillo, 2011; Smith et al., 2015), whereas students were most dissatisfied with unappealing food presentation and taste of the food. Similarly, Smith and colleagues (2015) found those who participated in school lunch wanted to see an improvement of visual appeal and taste. Other studies have reported that high school-age students desire a variety of food choices and improved food quality, and that meeting these desires can improve participation rates (Gilmore, Brown, & Hutchinson, 1998; Marples & Spillman, 1995). Likewise, Meyer and colleagues (1998) concluded that providing a variety of food choices, flavor, and visual attractiveness is correlated with school meal satisfaction. Several studies have shown an association of taste and appearance with increased fruit and vegetable intake, and improved perception of school meals (Cohen, Richardson, Parker, Catalano, & Rimm, 2014; Meyer & Conklin, 1998). Taste and flavor of the food have the influential power to increase satisfaction, participation, and school meal acceptance (Cohen et al., 2014; Gilmore et al., 1998; Roseman & Niblock, 2007; Tuorila, Palmujoki, Kytö, Törnwall, & Vehkalahti, 2015; USDA, 2016a).

In the qualitative data portion of this study, students did not hold back on providing suggestions for ways to improve school lunch and expressed their food preferences. The students requested less use of processed foods, increased variety of food choices, and a desire for fresher, better tasting foods. Previous studies point out the importance of engaging students in the planning of school meals. While generally satisfied with the school staff and customer service, Smith et al., (2015) reported that students frequently felt their input about suggestions for school lunch was disregarded and students wanted their opinions to be heard. Castillo and colleagues (2011) reported that increasing communication is necessary to better understand the students'

perception towards the school lunch program. Some prior studies have shown that when the school took polls on students' food preferences for healthier school lunch changes resulted in an increased in school lunch participation (Wojcicki & Heyman, 2006), and increased fruits and vegetables consumption (Gosliner, 2014).

When new foods are introduced, whether as a result of meeting regulations, student suggestions or chef interventions, it is important to allow students an opportunity to taste the new foods. When Just and colleagues (2014) implemented a chef intervention, they emphasized the importance of allowing students to participate in an afternoon taste testing with the chef. In addition, the food service staff, the chef, and faculty promoted the chef created dishes during lunch time. The literature suggests implementing taste testing, nutrition education, engaging and communicating with the student body, increased scratch cooking, collecting student feedback, marketing of healthier food items, supplying nutrition information, and collecting student input in menu planning are beneficial ways to improve school lunch (Just et al., 2014; Smith et al., 2015; USDA, 2016a).

The way foods are presented in the meal service area also has potential to make food more appealing (Cohen et al., 2014; Gosliner, 2014). Executing *Smarter Lunchroom* strategies such as changing the food presentation, attractive display of food, increasing fruits and vegetable sales by moving fruit near the cash register, and changing the lunchroom environment to promote healthy eating can encourage students to purchase school meals (B.E.N. Center, 2014; USDA, 2016a).

Parents in this study generally were neutral in their satisfaction with school lunches, but the satisfaction was higher among parents of children who ate school lunch. This is important in that parents have the ability to influence their child's participation (Ohri-Vachaspati, 2014). The neutral satisfaction seemed to be driven by concerns related to the taste, appeal, and lack of fruit

availability. Research has shown the healthiness of children's meals is important to parents (Kubik, Lytle, & Story, 2005). In this study, parents were neutral in their thoughts about whether school menus offered healthy foods. This neutral position is somewhat reflected by a previous *Cooking for Kids* evaluation study with the school nutrition professional in which they did not believe that parents perceived the school lunch to be healthy (Till, 2017). As such, there is need to communicate the health benefits of school meals to parents.

Research has shown parents were interested in obtaining information about the school lunch program so they could discuss meals with their child (Bailey-Davis et al., 2013). Communicating with parents about the nutritional value of school lunch, encouraging them to try the meals, using social media or newsletters to inform parents about the meals, and obtaining their feedback are strategies that may increase their satisfaction and influence their child's participation (USDA, 2016a). Getting parents more involved with future *Cooking for Kids* projects and communicating the goals of providing students healthier, appealing, and flavorful food can increase the parents' awareness of the changes schools are making at lunch time. Additionally, providing assurance that students are getting nutritious foods when students participate in the school lunch program may improve parents' satisfaction.

Another important stakeholder group of the school lunch program are administrators and faculty. After the *Cooking for Kids* chef intervention, administrators and faculty had a significant shift from negative to positive comments pre- to post- intervention, and were most satisfied with the freshness and healthy choices of school meals. Consistent with the 2017 *Cooking for Kids* evaluation study, the school nutrition professionals perceived administration and faculty believed the school foods served in the cafeteria were healthy (Till, 2017). The qualitative data showed the school staff enjoyed the salad bars and commended the school nutrition professionals on their efforts in providing school lunch. This may be due to *Cooking for Kids* providing funding for

salad bars to school sites and using *Smarter Lunchroom* strategies to make the salad bar more appealing with fresh, vibrant, fruits and vegetables. Additionally, a faculty member who did not participate in the school lunch program commended the *Cooking for Kids* program:

“I also loved and appreciated the “visiting chef?” [Cooking for Kids] program. The students I had that were involved absolutely loved it. The chef was great at working with them. I also loved the cooking contest which he was a part of. Thanks so much for bringing real life experiences into the school.”

Furthermore, school nutrition professionals play a pivotal role in providing positive customer service to increase participation and satisfaction (Castillo, 2011). The shift to positive comments about salad bars and school nutrition staff reflected the administrators and faculty had an increase of satisfaction after the chef intervention. The support and collaboration of administrators and faculty is essential for promoting healthier food choices among students (Slawson et al., 2013). The literature has shown teachers are concerned about the nutritional health of students and that they support a healthy school food environment (Kubik et al., 2005). Encouraging the teachers to eat in the lunchroom and be positive role models may lead to student acceptance of the meals (USDA, 2016a). In addition, teachers can engage students in discussions about menu changes, promote the new meals, and inform them about the positive changes being made in the school cafeteria by such programs as *Cooking for Kids*.

To our knowledge, past chef intervention studies have not explored the effect of chef intervention on stakeholders' satisfaction. Within the literature, prior chef interventions have evaluated their effects on students' participation in the school meal program and their selection and consumption of health foods and generally found positive results (Cohen et al., 2012; Just et al., 2014, Till et al., 2017; Powell et al., 2017). This study confirmed previous reports that those who participate in school lunch were more satisfied, and factors that influence satisfaction were

appeal and taste of the food. Better understanding of these factors is needed to increase stakeholders' satisfaction with the school lunch program and, in turn, increase participation and ultimately stakeholders' diet quality.

Some limitations of the study may have contributed to stakeholders' overall satisfaction not increasing. One school year may not have been sufficient time to make enough changes to increase stakeholders' satisfaction. A common comment across stakeholder groups was desire for less processed foods, which could be a component of food appeal. For example, the chef intervention may need to be extended to allow time for changes in the types of foods procured, both on the open market and through USDA donated foods system. A second limitation was inconsistent marketing of the chef intervention to stakeholders across study sites; thus limiting stakeholders' awareness of changes in the school lunch program, including addition of salad bars and increase in scratch cooking. Lastly, there was a lower post intervention response rate compared to the pre-intervention response rate at school sites.

5.1 Null hypothesis with corresponding interpretation of results.

Null Hypothesis	Interpretation of Results
Null Hypothesis #1.1: There will be no change in middle/high students' satisfaction by participation group after chef consult.	Failed to reject the null hypothesis
Null Hypothesis #1.2: There will be no change in parents' satisfaction by participation group after chef consult.	Failed to reject the null hypothesis
Null Hypothesis #1.3: There will be no change in middle/high students' satisfaction by participation group after chef consult.	Failed to reject the null hypothesis
Null Hypothesis #2.1 There will be no change in middle/high students' satisfaction after a chef-consult intervention at the school site level.	Failed to reject the null hypothesis
Null Hypothesis #2.2 There will be no change in parents' satisfaction after a chef-consult intervention at the school site level.	Rejected the null hypothesis
Null Hypothesis #2.3 There will be no change in administrators' and faculty's satisfaction after a chef-consult intervention at the school site level.	Rejected the null hypothesis
Null Hypothesis #3.1 There will be no change in satisfaction between students who do and do not participate in the school nutrition program.	Rejected the null hypothesis
Null Hypothesis #3.2 There will be no difference in satisfaction between parents who do and do not participate in the school nutrition program.	Rejected the null hypothesis
Null Hypothesis #3.3 There will be no change in satisfaction between administrators and faculty who do and do not participate in the school nutrition program.	Failed to reject the null hypothesis
Null Hypothesis #4.1 There will be no change in middle and high school students' shift to negative to positive comments satisfaction after a chef-consult intervention at the school site level.	Failed to reject the null hypothesis
Null Hypothesis #4.2 There will be no change in parents' and guardians' shift from negative to positive comments satisfaction after a chef-consult intervention at the school site level.	Failed to reject the null hypothesis
Null Hypothesis #4.3 There will be no change in administrators' and faculty's shift from negative to positive comments satisfaction after a chef-consult intervention at the school site level.	Rejected the null hypothesis

Conclusion:

After a 9-month *Cooking for Kids* chef intervention, there was no change in satisfaction among students but there was a measured increase in satisfaction among parents and administrators/faculty. The qualitative research showed that administrators and faculty had an increase in positive comments pre- to post- intervention. Furthermore, those who participated in the school lunch program had higher satisfaction pre- to post- compared to those that participated less. Additionally, satisfaction with and participation in the program is driven by the appeal and taste of the food. Further research will need to be conducted to evaluate the influence of chef intervention marketing and community involvement with stakeholders' satisfaction as a result of chef-based intervention.

Implications:

This study identified taste and appeal as the main factors that influence school lunch satisfaction. Improving taste and appeal, may require more emphasis on utilizing taste testing with stakeholders, engaging them in decision making and communicating awareness of school lunch benefits (MacLellan et al., 2010). This can be achieved through establishing a social media presence, collecting feedback on food preferences, and increasing community engagement activities that may have the potential to change stakeholders' perceptions and increase satisfaction. Future *Cooking for Kids* projects can provide informational handouts, perform cooking/recipe contests, invite stakeholders to taste testing with the chef, encouraging the teachers and parents to eat school meals with students, and market the positive changes that are implemented. Community engagement and program marketing may be the missing factors to change stakeholders' perception and satisfaction after a *Cooking for Kids* chef consultation. Further studies will need to be conducted to explore if including community engagements and increasing intervention marketing with stakeholders would be beneficial.

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APPENDIX A



Administrative and Teaching Staff

School Nutrition Satisfaction Survey

Date: _____

Please take a few minutes to offer feedback on the quality of your lunch experience at the school cafeteria.

Instructions:

Listed below are several characteristics of school lunch programs. As you answer, use the phrase, "When I eat school lunch..." before each statement, and then rate your level of agreement by using the scale 1 (Strongly Disagree) to 5 (Strongly Agree).

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
The food is fresh.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The food tastes good.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is a variety of food choices.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The menus offer healthy food choices.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The food looks appealing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The menu has food I like.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The quality of my lunch experience is good.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Name of School District:

On average, how many times per week do you eat school lunch?

☐ Never ☐ 1-2 Days ☐ 3-4 Days ☐ Everyday

What is your gender?

☐ Male ☐ Female

Additional Comments:

APPENDIX B



Parent/Guardian School Food Satisfaction Survey

School District: _____ Date: _____

Instructions:

Please answer the questions below about your child's school lunch program. Rate your level of agreement by using the scale 1 (Strongly Disagree) to 5 (Strongly Agree). If you have more than one child please provide answers about the youngest child.

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree	I Don't Know
The food in the cafeteria is fresh.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The food in the cafeteria tastes good.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is a variety of food choices.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The menus offer healthy choices.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The food looks appealing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The menu has food my child likes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel good about my child eating in the cafeteria.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

On average, how many times per week does your child eat school lunch?

☐ Never ☐ 1-2 Days ☐ 3-4 Days ☐ Everyday

What is your child's grade level?

☐ Elementary School ☐ Middle School ☐ Junior High School ☐ High School

What is your gender?

☐ Male ☐ Female

How often do you eat with your child at the school cafeteria?

Additional Comments:

APPENDIX C



Middle School and High School

School Food Satisfaction Survey

Date: _____

Please take a few minutes to offer feedback on the quality of your lunch experience at the school cafeteria.

Instructions:

Listed below are several characteristics of school lunch programs. As you answer, use the phrase, "When I eat school lunch..." before each statement, and then rate your level of agreement by using the scale 1 (Strongly Disagree) to 5 (Strongly Agree).

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
The food is fresh.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The food tastes good.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There is a variety of food choices.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The menu offers healthy good choices.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The food looks appealing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The menu has food I like.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get to socialize with my friends.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Name of School District:

On average, how many times per week do you eat school lunch?

☐ Never ☐ 1-2 Days ☐ 3-4 Days ☐ Everyday

What is your grade in school?

☐ 6th Grade ☐ 7th Grade ☐ 8th Grade ☐ 9th Grade ☐ 10th Grade
☐ 11th Grade ☐ 12th Grade

What is your gender?

☐ Male ☐ Female

Additional Comments:

APPENDIX D

Oklahoma State University Institutional Review Board

Date Monday, October 2, 2017 Protocol Expires: 10/1/2018
IRB Application No: HE1576
Proposal Title: Cooking for Kids Consulting Chef Evaluation

Reviewed and Expedited
Processed as: Continuation

Status Recommended by Reviewer(s) Approved

Principal
Investigator(s)

Deana Hildebrand
315 HES
Stillwater, OK 74078

Barbara J. Brown
301 HES
Stillwater, OK 74078

Cassidy Ring
319 Scott Hall
Stillwater, OK 74078

Approvals are valid until the expiration date, after which time a request for continuation must be submitted. Any modifications to the research project approved by the IRB must be submitted for approval with the advisor's signature. The IRB office MUST be notified in writing when a project is complete. Approved projects are subject to monitoring by the IRB. Expedited and exempt projects may be reviewed by the full Institutional Review Board.

☐ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

The reviewer(s) had these comments:

New subject enrolment still in progress. No new changes. No changes in risks/benefits. No reportable events, withdrawals, or complaints. Continued funding from Oklahoma State Department of Education

Signature :



Hugh Crethar, Chair, Institutional Review Board

Monday, October 2, 2017
Date

VITA

An Truong Nguyen

Candidate for the Degree of

Master of Science

Thesis: EVALUATION OF A CHEF BASED INTERVENTION ON
STAKEHOLDERS' SATISFACTION WITH SCHOOL LUNCH

Major Field: Nutritional Sciences

Biographical:

Education:

Completed the requirements for the Master of Sciences in Nutritional Sciences at Oklahoma State University, Stillwater, Oklahoma in August, 2018.

Completed the requirements for the Bachelor of Science in Human Nutrition-Dietetics at Metropolitan State University of Denver, Denver, Colorado 2016.

Experience:

Accepted for presentation at the Society for Nutrition Education and Behavior
51th Annual Conference Poster Session in July, 2018.

Professional Memberships:

The Academy of Nutrition and Dietetics and The Oklahoma Academy of
Nutrition and Dietetics